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The London County Council and Fair Wages.

THE recent debates in the County Council have practically left unaltered the main principle which the Council decided to adopt last May, namely, to give the workman what is considered fair wages, whether the work was done directly by the Council or indirectly through a contractor. The last discussions have arisen in regard to the manner of fixing such fair wages. The contention of those who opposed the recommendation of the Fair Wages Committee was that under it Trades Unions would be able to exact any rate of wages which they pleased. The object of Mr. Frederic Harrison's amendment was to limit the wages to the rate actually obtained by members of Trades Unions. It is some consolation for the ratepayers of the Metropolis that the recommendation of this Committee was limited to some extent by the adoption of Mr. Harrison's amendment. The debates, however, were chiefly interesting for the light thrown on the views of the Council and on the divisions which this question is obviously beginning to cause. Mr. Hood Barrs, the chairman of the Committee in question, observed, in the course of his speech on the second day's debate, that the clause, as amended by Mr. Harrison, "would afford no assistance to those trade unions that were weak and helpless, and could not obtain their terms, however reasonable, from their employers." In other words, the chairman of the Committee looked at the matter not from the point of view of those whose interests he was elected to safeguard, namely, the inhabitants of the metropolis generally, but from the point of view of the workmen who are to do the work for the inhabitants of London. It is, of course, right that workmen for a fair day's work should get a fair day's wage, but this is a matter which unions and combinations of workmen can get for themselves. The persons who purchase the labour are not their protectors. It would be interesting to know whether Mr. Hood Barrs, who is a solicitor in London, ascertains whether the men who copy the deeds and documents which he sends out to his stationer obtain what he regards as a fair rate of wages; whether he makes any stipulation that these copyists, men generally far worse off than the ordinary manual labourer, shall be properly paid. He would probably say that it is a duty which he owes to his clients to get the work done for as little as possible. The fact is that there are a certain number of members of the County Council who appear to have lost all just perception of the duty of representatives.

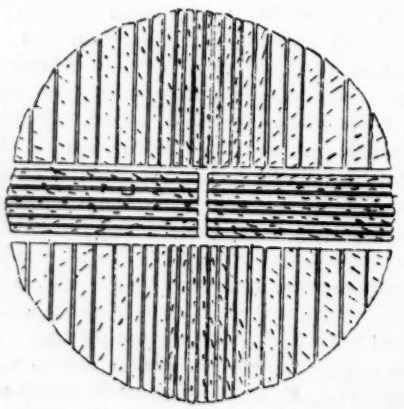
We stated also that light was thrown on the divisions which this subject is beginning to cause in the Council. Sir John Lubbock and Sir Thomas Farrer, both liberal and large-minded men, are both opposed to the views of the majority of the Council. They represent clear-headed liberalism, and it is certain that in the long run their views will prevail, even though for the moment less sound opinions are the most powerful in the Council. The extraordinary want of business perception in the majority of the Council is shown by the fact that they have decided to give trades-union rates of wages, not only when they do work for themselves, but when they employ contractors, and that they have decided to do without the latter in a large number of cases, and to be their own contractors, if it is permissible to use such a phrase. The ordinarily sensible and prudent Town Council is satisfied to make the best bargain it can with a contractor, and to see that it gets good work for its money. Lord Rosebery recently spoke in favour of the amalgamation of the City with the rest of the metropolis. Until greater prudence characterises the work of the County Council, the public and Parliament will do nothing towards this end. On the contrary, it is possible,—if the present management of the County Council raises the rates,—that a cry will arise that London be divided into certain districts, which shall manage their own local affairs.

STRUCTURE AND PROPERTIES OF OAK.

IN the oak family, botanists enumerate a large variety, but the definitions in many cases are so fine that it may be said many are so closely related to each other that for some practical purposes a large portion will admit of being grouped, and the present object fully served by passing over some of the minor distinctions in botanical nomenclature, as it is the physical conditions of the wood that constitute a difference in manufacture; and especially must this view be taken when it is considered that woods of the same species differ very considerably in quality. Therefore, a personal and practical knowledge is required to ascertain correctly the value of any difference that may present itself, and to acquire this a minute inspection should be made of the structural arrangement and the texture of the wood, as seen in the ends of logs or boards, &c. In oak of the highest quality in strength and durability, it will be found that the vascular tissue or pores are limited to one line in each concentric ring, and the cell tissue that is mixed with the wood in the rings occupies but a small space in proportion to the amount of wood, which is of a compact and dense nature, consequently less liable to have those concealed defects which are common in logs that have two or three lines of vascular tissue to each concentric ring, and the cell-tissue in about equal proportion with the lignine. It may be here stated that oak with one line of vascular tissue to each concentric ring is seldom met with, while that with two or three lines of pores to each ring is frequently found. But the quality of the wood does not so much depend on one or two lines of the tissue as it does upon the quantity and distribution of the cell-tissue which is intermixed with the wood contained in the rings. On the extent and state of this tissue the quality of the wood should be determined; that is, with all those well-known characteristics that point out in a more conspicuous way the general

condition of the wood. Therefore, special attention requires to be given to the texture of wood, and to form a correct estimate of the quality of an oak log or billet before it is converted into planks or boards, a minute examination of both ends of the log or billet should be made, and the distance apart of the vascular tissue or pores situated at the edge of each concentric ring carefully noted, also the quantity of cell-tissue, and the proportion this tissue stands in to the wood in the rings. In selecting logs for the purpose of converting them into boards suitable for work that requires to be light in colour, with a rich appearance in the silver grain or figure, the examination is restricted to the ends of the logs or billets, where if the wood be light in colour it will appear as a bluish grey, and the state of the silver grain or medullary ray can easily be distinguished radiating from the centre to the circumference as thin white lines. On the state of these lines will depend the quantity of figure in the wood, and to make a correct estimate of them the logs, &c., must be examined in cross section, as logs with a close resemblance on the sides indicate a decided difference in the ends. In all cases the colour of the wood and that of the ray or silver grain should be carefully noted, as a light and dark shade will be found in trees of the same species, but this not unfrequently proves serviceable in panelling and framing, to use the light shade for panels and the dark shade for stiles, or *vice-versâ*. By a judicious arrangement of the wood in which the silver grain is conspicuous, an effective surface can be produced; but as the number of boards that can be had from a log with this figure fully developed is very limited, it is well to consider carefully the thickness they should be cut to. The reason of the number being so restricted is that the medullary rays radiate in a direct line from the centre to the circumference of the log, and it is only those boards that are sawn out parallel with the rays which as figured wood will be most perfect. In a number of boards taken out of a log, even if it is first cut on the quarter, the ray will be situated obliquely in many of them without in any way adding to their appearance, or giving but a faint indication of being present in them.

To cut a log on the quarter implies that it be first cut into three flitches or parts, and to take a log 29 in. or 30 in. in diameter, the thickness of the flitches should be respectively 7 in. and 11 in.; the central part 7 in. and the two outside parts 11 in. each. The centre of the middle flitch, which contains the heart, is generally defective and requires to be cut out, as it is unsuitable for manufacturing purposes; thus making the central flitch into two parts, which, with the two sides, constitute the four quarters. In converting the flitches into boards, the two central parts should be cut the deep way and in direct line with the ray. By cutting in this way, each board taken from them will



Transverse Section of Oak Log cut on the quarter. Dotted lines show the ray or silver grain in the wood, and the boards in which figure will be conspicuous on their surface.

show the silver grain in its most perfect form (see diagram). In dealing with the side flitches, and to insure the greatest number of figured boards from them, they require to be cut at a right angle to the face line, or the side which had been sawn when opening the log, and here it will be observed that it is only those boards that are taken out of about 7 in. of the immediate centre of these flitches that have the silver grain fully showing on their surface. In a large portion of the wood on either side of this no appreciable indication of this grain will be given, on account of the angle at which it is situated to the line of the saw-cut, so that these portions will be of less value as ornamental wood, except to give variety and effect to those parts which display the silver grain. By converting an oak log into boards in this way the greatest amount of workable wood is realised with the least possible waste, and the highest number of boards that have the silver grain fully appearing on their surface, as each flitch will give seven boards, $\frac{7}{8}$ in. thick, allowing $\frac{1}{8}$ in. for waste in each saw-cut. The boards taken from the central flitches will give a breadth of 1 ft. 2 in., and those from the side flitches an average breadth of from 10 in. to 11 in.

The oaks that are principally in demand at the present time in British commerce and manufacture, viz, British oak, Russian and Prussian oak, Austrian oak, and American oak, differ from each other so far that it is important to possess a complete knowledge of each. In the early history of this country native oak occupied a prominent place, and it still continues to be in this position amidst the many varieties of oak annually imported to meet the requirements of the present advanced state of the various industries that demand a particular kind or quality of wood. In British oak it will be observed, as previously stated, that the characteristics which distinguish the highest qualities are one line of pores to each concentric ring, and the cell tissue little more than discernible to the unassisted eye; but oak of this description is seldom met with at the present time, as doubtless it had been largely drawn upon during the period of the "wooden walls," and the foresters of that day must have acted on the motto,—slightly altered,—sufficient for the day is the supply thereof. Nevertheless, a large portion of British oak that is at present available contains the elements of strength and durability.

The primary conditions essential in the structural arrangement in oak of the best quality consist in a close combination of the fibres, small pores, and comparative absence of cell tissue in the lignine. Oak that combines these characteristics with a fresh and clear unmixed colour, straight-grained, and free from twist or defective knots, is well suited for beams or columns that are required to bear heavy strains, and it is also specially fitted to resist the influence of deleterious matter in whatever position it may be placed. In choosing lengths for columns, beams, or scantlings, an examination of the end furthest from the butt should be carefully made, as the state of the texture of the wood will be inferior at this end to that at the butt end. Therefore to judge the strength of beams, &c., by observation, the structural conditions of the ends furthest from the butt must be taken as the gauge of the strength of the column beam, or scantling. In a log of British, or any, oak, 21 ft. long, conditions in the vascular and cell tissues will be found that will indicate three grades of strength in this length, and if the log be cut into three equal parts, of 7 ft. each, this may be proved by the state of the texture which appears in the cross sections of these parts. The first 7 ft. from the butt, if of a good quality of wood, will have an average of six concentric rings to the inch, with the cell tissue in the woody portions of the rings comparatively limited, and a specific gravity, when thoroughly seasoned, of about 940 oz. to the cubic foot. In the second or central 7 ft. the specific gravity will be about 860 oz. to the cubic foot, and the average number of concentric rings to the inch will be about ten, with an increase of the cell tissue in the woody portion of the rings, and the third 7 ft. or top portion of the log will have an average of about fifteen concentric rings to the inch, and a specific gravity of 830 ozs. to the cubic foot, with a considerable increase in the quantity of cell tissue in the wood of this portion compared to the first 7 ft., or butt end of the log. This difference in density in the three lengths will be found to be a cardinal point in estimating the strength and durability of the wood, and as the difference in the specific gravity of the three portions of the log, so is the difference in the relative state of the lignine, cell tissue, and vascular tissue: hence the difference in strength and durability. And in making a selection for beams that are required to bear heavy strains a minute examination should be made of the relative state of the tissue and the woody fibre; for, however suitable the wood may appear on the sides of the beams, the true state of the texture can only be ascertained by making a correct and thorough examination of the ends, and a careful investigation in this way when selecting oak for columns that are required to support a great weight is even more important than in selecting for beams, as in columns the pressure is nearly equal throughout the entire length, and to the full extent of their diameter. Beams or columns may be taken out of a log with the greatest care to avoid imperfections, such as the immediate heart wood, which has become over aged, consequently brittle, and the albumen or sap wood, which is not sufficiently matured, but a safe conclusion regarding strength must be based upon the texture of the wood in the end that gives the least quantity of lignine to tissue, as this is the weakest part and the first to give way under pressure, and to rely exclusively on a given constant for the breaking strain would be to ignore the natural laws that govern wood.

Russian and Prussian Oak.—The ornamental figure, or silver grain, peculiar to oak is not generally so prominent in British oak as it is in Russian, Prussian, Austrian, and American oak. In Russian and Prussian oak the fibre is fine, straight, and hard, with a firm combination in the grain of the wood, and in colour it is frequently of a light tone. The figure, or silver grain, which in many instances is much lighter and of a shifty shade, gives lustre to it. A good selection of this wood will sustain a high finish, and it is well suited, on account of its light colour, for cabinet work or joinery. In examining in cross-section logs or quarters of logs of this wood it will be discerned, in those that are rich in figure, that the lines of the medullary ray are fine, and closely situated at regular distances from each other. "Dantzic oak" is a term that is frequently applied in the retail timber trade to all the oak imported from Riga, Memel, Dantzic, and Stettin, from the contiguity of these ports to the forests from which the wood is taken; and although situated in two countries, the difference in the general quality of the wood is hardly appreciable in a practical sense, except that occasionally very superior-grained and figured wood is imported from Riga, while many of the Stettin shipments are slightly inferior. The principal features in Russian and Prussian oak are the fine quality of the fibre and figure, and firmness in texture, yet it will be observed that the pores, although small in diameter, are numerous, but the small proportion of cellular tissue renders it the most suitable oak for the manufacture of furniture, and in some cases for joinery, when a close, hard grain is required.

Austrian Oak.—In Austrian oak, the pores and cell-tissue make up about three-quarters of each concentric ring, but the close combination of the woody fibre renders it moderately hard, tough, and strong. The grain is frequently found to be straight, and when converted into boards, those that are cut in line with the silver grain are richly marked, and well suited for wainscotting, &c. In selecting logs of this wood that are to be converted into boards for special purposes, it will be necessary to make a careful examina-

tion of the ends to ascertain the relative state of the tissue, fibre, and medullary ray, as a considerable variety may be met with in a small number of logs.

American Oak.—The oak imported from America into this country as Baltimore, or Quebec, or red oak, will be found in weight, when thoroughly seasoned, considerably less in proportion to volume, and decidedly inferior in strength to British oak. This may be accounted for by the large amount of cellular tissue that is intermixed with the fibre, and the comparative width in the diameter of the vascular tissue, all of which give to this wood a soft and spongy nature that exclude it from structural work where high degrees of strength are required. But to apply this description to all the oak that is imported into this country from America, in log form, and in a semi-manufactured state, would not be in keeping with the characteristics which, to a certain extent, have placed what is commercially known as American white oak in competition with British oak. The quality of the white oak is in every respect much superior to the red oak. In structure and weight, after being thoroughly seasoned, it compares favourably with British oak. It is light in colour, and in some instances the fibre is so fine that it closely resembles Austrian oak. In structure it resembles British oak, but it has not the same rigidity and elasticity; but where pliant, tough, and durable wood is required, American white oak of good quality is in every respect suitable.*

NOTES.

IN the discussion on Dr. Dörpfeld's paper at the Institute Mr. Penrose observed that he did not think sufficient justice had been done to Mr. Fergusson's theory of the lighting of the Parthenon, and in one sense this is the case. The ingenuity with which Mr. Fergusson worked out a method of lighting the temple, which was perfectly possible constructively without interfering with its exterior effect, was most remarkable; but he had not a shred of evidence, either literary or in the way of architectural fragments, to support it; it was simply a theory. Further consideration has convinced most students of architecture that there was no need for this elaborate contrivance, and that the temples could have been lighted sufficiently for their purposes from the open door; and we do not think this conclusion is likely to be disturbed in future. The result shows the danger of evolving theories of architectural construction out of one's inner consciousness. We do not understand why Dr. Murray represented the English critics as having generally accepted the hypæthral theory of the Greek temples. In the earlier part of this century it was so, but, as far as we know, the idea has been for many years abandoned by all who have any right to an opinion.

MR. BALFOUR'S address at Manchester this week on the subject of technical education did not throw any fresh light on the subject from a practical point of view. It was, however, useful for emphasizing the fact that the country is now committed to a system of technical education, and that it cannot draw back. It is true that that system is very imperfect, and that the objects are frequently much misunderstood. There is too much of an impression abroad that technical education is merely what may be termed "workshop teaching," whereas in truth it should be education in the basis on which technical work rests. We do not want to make a number of amateur carpenters and carvers, to take a homely instance; we wish to make those who are carpenters and carvers by trade more skilful. As Mr. Balfour points out, we have to face increased foreign competition, and technical education is intended to assist the workmen of this country in their competition against foreign rivals. It was by no means amiss, also, for Mr. Balfour to point out that technical education can never be an education in itself. The dignity of labour,—to use a cant phrase of the day,—is all very well, but the mind requires something broader than the mere imparting of technical knowledge.

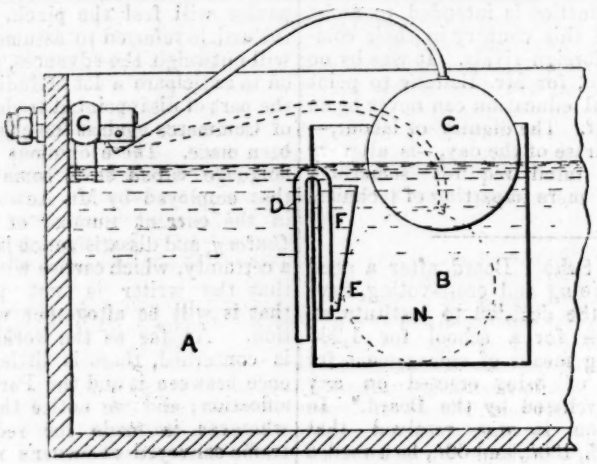
THE London School Board, after a good deal of arguing and cross-voting, have finally come to the decision to institute an open competition for a school for 1,200 children, showing means of enlargement for 1,600, "capable of being erected on any ordinary site purchased by the Board." In further discussion it was resolved that premiums of 150*l.*, 100*l.*, and 50*l.*, be awarded "at the discretion of the Assessor" (who is to be the President of the Institute of Architects for the time being, or any one whom he may appoint); that the premiated plans are to be the property of the Board; that "the Board do not bind themselves to employ the successful architect in the erection of the school," and that the designs be accompanied by general specifications and reports showing the system to be recommended for heating, ventilation, and drainage, and by an alternative plan showing arrangement of one hall for the three departments, subject to and in conformity with the regulations of the Education Department. The competition is not, upon these lines, any very great temptation to architects, and we do not think the Board will find that any architects of eminence will trouble themselves about it. As it stands, as the plans are to become the property of the Board, and they are not bound to employ the successful competitor, it simply resolves itself into a competition to procure new ideas for the Architect's department of the Board. But the most absurd thing of all is the determination to have a competition for no fixed site,—a competition for a school in the air, as it were. For various reasons, we should have thought that a determination to employ outside architects on some at least of the schools was to be commended (though, as we have already said, the official architect of the Board ought to have the position of consulting architect); but it should have been a competition for a definite school on a definite site. The first thing any architect who is worth the name wants to know, when called on to plan a building, is the nature, position, lighting, &c., of the site; that is what in a great measure determines his plan; and to put up a competition for an ideal school, irrespective of site, will prove little more than wasting the Board's and the architects' time, as well as the ratepayers' money.

IT is stated in the course of a special article which appeared in the *Times* last week on the subject of railway rates, that if things "shake down," on the basis of the present revision, the railway companies stand to lose a considerable portion of their revenue. This, it is remarked, will be a consequence of too liberal treatment in the past,—low actual rates having been adopted by Parliament as the standard in fixing maximum rates. As a number of the new rates are now open to public inspection at the various stations, traders will soon be able to judge how far this alleged loss of the companies is their gain; but we doubt if their experience will tend to confirm the estimate alluded to. As far as we have been able to learn, a considerable proportion of the new rates correspond with the authorised maximum charges, no margin whatever for contingencies being thus left. On the other hand, a number of old-standing special rates are retained, which are generally below the statutory limit. Still no loss of revenue can be said to be involved in the retention of existing rates, however low; and it is where the old rates are perforce reduced in order to bring them within the Parliamentary limit that the companies will feel the pinch. The writer of the article referred to assumes that the latter will outweigh the advances, although he goes on to anticipate a lot of indignant protest on the part of disappointad traders and Chambers of Commerce against the changes which have been made. These opinions are expressed in language which bears some resemblance to that employed by Mr. Acworth in his article in the current number of the *Nineteenth Century*, and dissatisfaction is prophesied with a certainty, which carries with it a conviction that the writer is not prepared to say that it will be altogether without justification. As far as the working classification is concerned, there is little, if any, difference between it and the Parliamentary Classification; and we notice that no provision whatever is made for reduced rates for traffic conveyed at owner's risk. It is to be hoped that this is one of the matters not yet settled, for, if the owners' risk regulations are to be swept away it will be a very serious matter for many trades. In the scale for "smalls" the companies have exerted their full charging powers at the outset, and will probably not lose much after all by the reduction of the "smalls" limit from 500 lbs. to 3 cwt. It appears that the effect and intention of the Order we alluded to last week is really to exempt the companies from giving publication in detail of the January alterations, being in fact a temporary suspension for two months of the Order directing such publication. After March 1 the publication, as prescribed by the original Order, will again be compulsory; and extracts from the rate-books will be furnished on application during the interval,—probably without charge to regular customers, though a charge is announced at the rate of 6d. per 50 rates quoted.

THE September volume of the "Transactions of the American Society of Civil Engineers" contains a paper entitled "Wind-bracing in High Buildings," in which the writer points out that, although architects vary considerably in their individual practice while agreeing collectively upon main principles, yet in such lofty structures as the increasing value of land calls upon them to design, they generally adopt walls of thick section, and floors composed of heavy-rolled joists, with or without columns, which are merely supported or fixed at their seatings without any bracing; and the author advocates, as a preferable system, a more developed form of construction with the use of an elastic material, consisting of built-up and braced members composing a skeleton framework, to be subsequently filled in, as required for walls and partitions. While naming 40 lbs. per square foot of exposed surface as a maximum unit wind pressure necessary to provide for, he draws attention to the fact that the wind sometimes developes an energy exceeding average measurements, and that a building of great height, even with a good breadth, can better sustain the effect of shocks, when formed of continuous framework, which admits of efficient bracing, than it can when the usual more solid forms of constructions have been adopted; more particularly if the structure happens to be built upon a yielding foundation or to be isolated in position or subject to vibration, due to the running of heavy machinery, which tends to loosen the hold of the floor upon the walls. Among other papers in the volume we find one which states various records of rainfall, its flow and storage in America, and a useful, practical paper upon 'Roofing Slates," in which the writer points out the necessity of investigating both the chemical analysis and the geological aspects of the slate-quarry.

IN his last four-weekly report (November 6 to December 3) on the sanitary condition of Kensington, Dr. Orme Dudfield refers to the fact that the Board of Works of St. Giles's district have recently addressed a communication to the Board of Trade in regard to the inadequate capacity of the water-closet

*To be concluded in our next, when we will give also some photographic reproductions of sections of various oaks, taken from the actual wood.



Faija's Patent Ball-cock Apparatus.

service system allowed by the water company (two gallons), requesting the Board of Trade to take steps "with a view to the 21st regulation being altered so as to provide for the use of cisterns or service-boxes which will permit of a discharge of not less than three gallons of water at each flush." The St. Giles's Board have also sent a copy of their letter to the several sanitary authorities, asking them, if they agree with this view, also to address the Board of Trade on the subject. It is almost needless to say that so efficient a medical officer as Dr. Dudfield entirely concurs in the objection to this inadequate supply of flushing water, to which we have also called attention some time since. It is not merely that the two gallons is inefficient to properly flush the closet; it is a question also of proper cleansing of the house drain and securing the rapid and efficient carriage of solid matter into the sewer; and to stint water for such a purpose is leaving an extra probability of the fouling of drains. Dr. Dudfield believes that some of the water companies are of the same opinion, and do not exercise their legal power of objecting to a three-gallon flush; but it is most desirable that the regulation should be amended and the power of thus improperly curtailing the water-flush be no longer left as an anti-sanitary weapon in the hands of the water companies.

AN improved ball-cock apparatus has been invented and patented by Mr. Faija, the well-known engineer, who has kindly allowed us to bring it before our readers. The object of it is to obviate the disadvantage arising from the constantly-diminishing flow of water from the ordinary ball-cock as it approaches its closing point. The manner in which this is effected will be understood from the diagram, coupled with the following quotation from the specification of the patent:—

"In the diagram, A is a portion of the cistern or tank into which it is desired to regulate the flow of water or other liquid, and B is a separate vessel which may be placed either inside or outside the tank A, in which the ball G rises and falls, actuating the tap C, by which the cistern A is filled.

D is a syphon by which the water or liquid is drawn out of B, into the cistern A.

E is an air-escape hole surrounded by the open vessel F.

The action of the apparatus may be thus described. The cistern A being empty, the vessel B will also be empty, or nearly so, and the ball will be in the position shown by the dotted lines; the tap C will be open, and consequently the cistern A will be filling gradually, but no liquid will flow into B, until such time as the liquid or water in A has reached to about, or above, the top of the syphon D, and until this desired level is reached the tap C will be full open; when the liquid has reached this level, however, it will commence to flow through the syphon D, which, in this instance, acts only as a conduit, quickly filling the vessel B, which is of small relative capacity, and thus the ball G will be raised, and the tap C closed, when also the vessel F, surrounding the air escape hole, will be filled. As the cistern A is emptied the vessel B will remain full, and the tap C, therefore, closed, until such time as there is sufficient difference in the level of the water or liquid in the two vessels for the syphon to start, and as the vessel F will then be full of water, the air escape hole E will be sealed, and consequently the vessel B will be emptied to any desired level below it, as, for instance, to the dotted line N. The vessel F, which may be emptied by the air escape hole E, or by perforations in its lower portion, or by both, will by this time be empty, and the air escape hole E unsealed. As the cistern A fills, the water or liquid rises in the longer leg of the syphon D, and the air in the syphon is forced out through the air escape hole E, thus allowing of the flow of liquid from the vessel A into B to commence when this desired level in A has been reached, which flow will continue until B is full, and the tap C closed as already described."

We have long thought that the action of the ordinary type of ball-cock was capable of improvement so as to secure full running up to the moment of cutting off the water, and the object is here attained in a very neat and scientific manner.

THE trustees of the Spanish and Portuguese Synagogue Charity are willing to grant an eighty years' building lease, at the annual rent of 350*l.*, of two parcels of land in St. Katharine Coleman parish, City. On the one piece, containing about 1,000 square feet, now stand Nos. 9 and 10, Jewry-street; the other, about 4,000 square feet, lies at the back, and consists of Cock-court, with the nine almshouses which for some time past have appertained to the Charity. By the entrance into the court is No. 7, one of the last remaining of the old gabled houses in the street, which until about 100 years ago had retained its pristine name of Poor Jury-lane, as having been occupied mostly by Jews. The court itself is that described in Strype's edition (1720) of Stow as "Holsey's-rents, very small and ordinary." South-west of the court lies Northumberland-alley, which displaced some dicing-houses and bowling-alleys that had been set up in the gardens of the house of the Earls of Northumberland, who lived there in the fifteenth century. Next beyond was the Coleman-haw, or garden, which gave a name to the church. This latter, which it has been proposed to demolish, escaped from the Great Fire, and was rebuilt, at the parishioners' cost, in 1734. It is thus described by the late George Godwin, in his "Churches of London," 1839:—

"The fabric as it now stands. . . . . is quite undeserving of illustration, except as serving as an evidence of the improvement which has taken place in public taste. It may be confidently stated that no parish in the metropolis would now allow such a piece of ugliness to be erected. It is built of brick, and has rusticated dressings of stone around the windows and doors. The interior presents merely a plain room with a flat ceiling coved at the sides, ornamented by one large oval panel with a flower in the centre. The altar-piece stands within a circular-headed recess at the east end, and is quite plain.

AS an addendum to our "Note" of last week, it may be as well to call attention to the fact that when Mr. Tate's new gallery is erected on part of the site of the old Penitentiary at Millbank, the land will but be reverting to one of its former uses, for it was here that the head of the Grosvenor family, during the last century, laid the foundation of that noble gallery of pictures which is now the chief ornament of the Duke of Westminster's house in Upper Grosvenor-street. It is also not a little remarkable that Lord Ebury (better known, perhaps, by his former title of Lord Robert Grosvenor) has lived to witness the commencement of the demolition of the Penitentiary, though he was born at "Millbank" when it was his father's town house in the first year of the present century. In the parish church of St. John, hard by, is a mural tablet recording the fact that in 1800 King George III. and his Queen Charlotte stood within its walls as sponsors in person at the baptism of Lord Ebury's elder brother Thomas (afterwards Earl of Wilton). The house inhabited by the Grosvenors at Millbank was built in 1735, on the site of old Peterborough House, which figures in one of Hollar's views of London.

THE "Journal of the Franklin Institute" for November contains among other articles a paper upon Ship Canals, in which the author cites a few examples as a comparison for a projected work. His paper treats the subject from a financial point of view, and does not describe construction, but we allude to it, because we entirely endorse the great importance he attaches to the provision of ample depth of waterway.

THE Goldsmiths' Company, as trustees, are prepared to grant an eighty years' building lease, at 385*l.* per annum, of the site of four houses, Nos. 13—6, Little New-street, Shoe-lane (south side). The lessee is to covenant that he will spend on the erection of new houses a minimum sum of 7,000*l.* within twelve months after Midsummer-day, 1896, when the existing leases of Nos. 13—5 will expire. The ground covers about 3,600 ft. superficial, having north and east frontages to Little New-street and New-street-hill, respectively. The property, consisting originally of six houses, was devised in 1652 by Francis Ash to the Company, conditionally upon their paying 20*l.* annually to the town of Derby, and making certain payments to their officers and pensioners. Close by, in the middle area of New-street-square, is McLean's-buildings, which occupies the site of the old tenements, pulled down in 1852, of which T. H. Shepherd's two water-colour drawings are in the Crace collection, and which after the Great Fire succeeded some property bequeathed to the Company by Agas (or Agnes) Harding in 1513. In 1824, Thomas Harding gave them 2,396*l.* Consols, and 3,000*l.* Reduced Annuities. These, and Sir James Pemberton's bequest of 200*l.*, in 1613, are commemorated by the names of East and West Harding-streets, and Pemberton-row (*prius* Three Leg-alley), in this same quarter. The Goldsmiths own most of the property round about New-street-square; their coat-arms are affixed to several of the houses, and are carved on two stones; the larger bearing also the date, "1670;" let into the wall of the footway descending from the square into Robin Hood-court. We are informed that most of the buildings which form Messrs. Eyre and Spottiswoode's premises occupy sites belonging to the Goldsmiths. The house, being No. 10, in Little New-street, where Dr. Johnson, Warburton, Robertson, Hume, and others, used to visit William Strahan, who bought, in 1770, a share of Eyre's patent as King's printer, stood by the corner of Printer-street. No. 10, with its garden, and Nos. 11-2, were demolished about twenty-five years ago for Messrs. Eyre & Spottiswoode's binders' warehouse, which adjoins Nos. 13-6 mentioned above.

A CORRESPONDENT sends us a characteristic piece of information as to the value set upon a competent surveyor's assistant in some places. Seeing an advertisement in a widely-circulated North of England paper that an assistant was required in the office of the Borough Surveyor in a

large manufacturing town, he applied for particulars, which were as follows:—

"1. To draw plans and sections as is usually required in a Surveyor or Architect's office.
2. To take, and reduce levels, and plot on plan and set out when required.
3. To attend one or two meetings at night during each month.
4. To sketch, report to Surveyor, and superintend any works.
5. To act generally under the Surveyor's instructions.
6. Salary 52*l.* per annum.
7. The person appointed must reside in the borough."

As our correspondent observes, comment on this is superfluous.

WE are entirely in sympathy with most of the views expressed in Mr. Thomas's paper on "Formal Gardens" at the Architectural Association, but we must protest against his contemptuous manner of dismissing Repton as one of a set of bunglers of the same class as "Capability Brown." Repton was a very able man, and on a far superior level to Brown, and a great many of his hints and criticisms are admirable, from whatever point of view we regard the subject.

ROYAL INSTITUTE OF BRITISH ARCHITECTS:

THE HYPÆTHRAL TEMPLE.

THE fourth ordinary general meeting of this Institute for Session 1892–3 was held on Monday evening last at Conduit-street, the President, Mr. J. Macvicar Anderson, in the chair.

Four gentlemen were nominated for election as Fellows, nine as Associates, and one as Honorary Associate.

The Institute of Architects of New South Wales.

The President said he wished, with the permission of the meeting, to move a resolution in reference to the alliance of another Society with the Royal Institute of British Architects, viz., the Institute of Architects of New South Wales. The matter had been before the Council for some time, partly owing to circumstances which it was not necessary to mention further than to say that amongst a certain number of their colonial friends there appeared to be some slight want of unanimity. The time had, however, now come when the Council considered that they were justified in recommending that the application for alliance should be granted. He would, with the permission of the meeting, read the petition which the Institute of New South Wales had sent. [The President here read the petition.] That was the first application which they had received for alliance with a society outside the United Kingdom, therefore they were proposing a new departure. He had the greatest possible pleasure in proposing that the Institute of Architects of New South Wales be admitted to alliance with the Royal Institute of British architects, because the Institute of New South Wales had done all that lay in its power during the last few years to maintain a high standard of professional character in the Colony. Their paper on professional practice, which had been published in the *R.I.B.A. Journal*, was a highly commendable document, and a perusal of it would show that the Institute of New South Wales was worthy of every recognition and support which alliance with the Royal Institute could bestow upon it.

Professor Aitchison seconded the motion, which was carried unanimously.

The Hypæthral Temple.

Professor Aitchison then read a translation by Mr. Gill of a pamphlet by Dr. William Dörpfeld on this subject. The following is an abstract of the paper:—After briefly summarising the violent disputes about the question of the existence and form of the hypæthral temples, and the diametrically opposed views thereon, as exemplified in the opinions of L. Ross and C. Bötticher, the author expressed his opinion that recent excavations had completely settled the point. Mr. Penrose's excavation of the Olympeion at Athens showed that that temple was octastyle, and thereby a new light was thrown upon the description of hypæthral temples given by Vitruvius (iii. 1). On that passage had been based the opinion that the Parthenon at Athens and the temple of Zeus at Olympia were hypæthral temples, and from that it was deduced that all the peripteral temples similar to those, with an interior order of columns, were hypæthral. By way of showing that that view was now untenable, the author proceeded, first, to note the chief arguments used for and against the existence of hypæthral temples. 1. It was argued that the cellæ of many temples could not, from their size and from architectural reasons, have received the necessary light from the door, and so a top light must be taken for granted,—though opinions differed as to the shape of this opening: wholly uncovered nave (K. F. Hermann); a small opening in the centre of the cella (C. Bötticher); openings of various shapes and sizes over the aisles (J. Fergusson). To that argument, and its assumption as to the amount of light needed, it was answered that although the light entering through the door of a cella could not have lighted up the interior in the way necessary for a modern museum, yet such an amount of light was neither necessary nor aimed at. The impression produced by the statue would gain in proportion as its details would only gradually be perceived by those entering, after they had accustomed themselves to the semi-obscurity. Some details of the chryselephantine statue were perhaps not distinguishable at all; but it did not follow from that that the door, as a source of light, became impossible. In the similar case of the sculptures on the exterior of temples,—for instance, the pediment and frieze of the Parthenon,—no one had deduced from the fact of their elaborate details (and even partly on their rear) that they could not possibly have been placed so high up on the temple. That the illumination from the door was, moreover, not so small as people usually supposed, was shown by J. Durm's tabulated statement of the proportion of the door-opening to the area of the cella of several Greek temples; to which must be added the consideration of the greater brilliancy of the Greek sunlight as compared with that of this country. 2. To the argument from the existence of altars in the interiors of temples,—that an hypæthron was needed for the escape of the smoke from sacrifices,—it was answered that sacrificial altars were generally in front, and not in the interior, of temples; and that ceilings blackened by smoke were not by any means considered unsightly. 3. The author rejected the argument from certain finds which had been deemed to indicate the existence of a skylight in the roof of some temples: such as the curb stone found near the temple of Aegina, and the tiles with round openings near the temples of Olympia, Phigaleia, Tegea, and Athens. These tiles were used for the lighting of the roof, at least in those temples whose roof was accessible, and when it was not thought desirable to put a window in the pediment. We had, therefore, no certain bodily proof for the existence of an hypæthron in a Greek temple. Nor had the defenders of the hypæthral temple laid any great stress upon the arguments indicated above. They had mainly based their theory upon the passage in Vitruvius. That passage, however, had now received, through the excavation of the Olympeion at Athens, an interpretation totally opposed to the one that it had hitherto received. The author discussed the passage, its *variæ lectiones* and different exegeses, and proceeds to show that whereas it was for philological reasons only that the new editors of Vitruvius had edited the passage so as to show that he only named a single example of an hypæthral temple (viz., the octastyle temple of Olympic Zeus at Athens), the late excavations had shown how right they were. It was now demonstrated that the Olympeion was octastyle, and not decastyle as had been commonly held; and every reason for believing that the "octastylos" of Vitruvius was the Parthenon had disappeared. The result of that demonstration was decisive for the author's argument. They were neither entitled to hold the Parthenon nor the Zeus temple at Olympia as hypæthral temples, nor could they admit that the majority of peripteral temples with an interior columniation were lighted hypæthrally. Secondary arguments had now become unnecessary; and those who still wished to hold by their views in favour of hypæthral temples had the onus of producing positive proof that the ordinary peripteral temples must have been lighted from above. It was not denied that the hypæthral temple did exist; but the temples which received their light through the ceiling were exceptions compared to the great number that were only lighted from the door. The author enumerated these exceptions, and pointed out that we should probably regard the cella of some of them as an open space surrounded by a colonnade and a wall, while around this enclosing wall was placed still another single or double colonnade, according as the exterior was intended to appear as a peripteros or a dipteros. At the time of Vitruvius, moreover, the Olympeion was probably not in a complete state, while after the completion of the temple by the Emperor Hadrian the cella might probably have lost its hypæthral source of light. Some hypæthral temples, too, were those of gods who had to be worshipped in the open air. The author's conclusion was that though a few great dipteral hypæthral temples existed, the Greek and Roman temples had as a rule no light from above, and were only lighted from the door.

The President said that the paper dealt with a subject of great interest, and he was glad to say that there were one or two gentlemen present who were specially competent to speak upon it. He was glad to see present Mr. Penrose, and Dr. Murray of the British Museum. He would ask Mr. Penrose to open the discussion.

Mr. F. C. Penrose said he had listened with great attention to Dr. Dörpfeld's paper. The Doctor had been kind enough to send him a copy of his pamphlet, and Mr. Gill's translation conveyed his views perfectly. In regard to the substance of it, he (the speaker) agreed in almost every point with Dr. Dörpfeld, with some slight exceptions. He thought, however, that Dr. Dörpfeld had not done entire justice to Mr. Fergusson's theory of the lighting of the Parthenon. But perhaps, before coming to the Parthenon, and in order to clear the ground (although Dr. Dörpfeld had already done that), he would say that in his opinion the Parthenon and the Temple at Olympia were quite out of the running, and the whole interest of the question of the lighting of hypæthral temples, so far as the remarks of Vitruvius went, rested with the Temple of Jupiter Olympius at Athens. But he wished to say that it was his belief that other temples had upper lights, though perhaps they were very small, and were covered by single tiles. These openings were, of course, not so considerable as the clearstory windows which Mr. Fergusson proposed for the Parthenon. It was quite possible, as Mr. Fergusson had said, that two tiles might have been taken up by such openings, and those openings would have let a glimmer of light into the cella of the temple; because, when the door was shut, the light in the temple would be very small indeed,—almost extinct, in fact. The great object in those temples, other than the hypæthral ones, was to admit the early morning sun. The great festivals, and perhaps the worship, were at sunrise, and the temples were so orientated as to allow the sun to shine right into the door and along the naos of the temple. Therefore, in the early morning, there was an abundance of light entering through the door into the interior of the temple, although later in the day, of course, the amount of light so entering would be greatly diminished, and it would be insufficient to allow of the interior of the temple being clearly seen. So much, then, for the ordinary temples, where the light was admitted mainly by the door, as Dr. Dörpfeld had explained. But then came the question raised by the passage in Vitruvius, which was a very interesting one indeed, and one upon which the work carried on by the Dilettante Society at Athens had thrown considerable light. He held that Stuart and others who held the decastyle theory were thoroughly justified in their views by the then conditions. The passage in Vitruvius said that the hypæthron was like the dipteros, except that it was lighted from the roof, the roof being open to the sky; therefore it followed as a natural inference that the hypæthral temple ought to be decastyle. He thought that the ingenious solution proposed by Wilkins was very happy from a literary point of view: he suggested that *decastylus* was a misreading, and that the letters *asty* formed part of *decasty*, which was intended to mean the great temple in the city, which was distinguished from that on the Acropolis. "There

was no example of that at Rome, but there was an example of it at Athens in the town." Excavations made during recent years on the site had shown that the Temple of Jupiter Olympius at Athens was octastyle, and not decastyle. Referring to a section of the Temple which was exhibited on the screen, Mr. Penrose pointed out what he, after Fergusson, conceived to be the position of the hypæthrum, Fergusson supposed, on the authority of a coin bearing a representation of the interior of the temple, that the temple was covered with a kind of waggon-vault, panelled or otherwise ornamented, and that the light was admitted by a great window at the east end of the wall. It so happened that on the very day of the great Olympian festival, viz., April 19 or 20, the sun in its course in the early morning shone straight through that window and on to the very place where the great chryselephantine statue was known to have stood. That circumstance was strongly confirmatory of Fergusson's theory that there was a large opening at the east end which could be closed by curtains when the weather was bad. From the passage in Vitruvius it might be supposed that the naos was open to the weather, but that could hardly have been so; the statue must have been protected from the weather. He had the greatest pleasure in expressing his agreement, in the main, with Dr. Dörpfeld's theory about the hypæthral temples. The great temple at Branchidæ, mentioned in MM. Rayet and Thomas's work, appeared never to have been completed.

Dr. A. S. Murray, Keeper of the Greek and Roman Antiquities in the British Museum, said he had very much pleasure in seconding the vote of thanks. He was there as a learner at the feet of men like Mr. Penrose and Dr. Dörpfeld, and he had listened with the greatest interest to the discussion, and in particular to the very vigorous reply which Mr. Penrose had made to Dr. Dörpfeld. They all admired Dr. Dörpfeld intensely, but they knew that he was nothing if not very thorough-going, and he thought that archæologically we in England had generally held to the hypæthral temple. He did not know why, but we were a practical people, and we read a little, and we had come to that conclusion. In considering this question they could not afford to ignore the *lacunaria* of the colonnades in Greek temples, which were frequently found to be pierced with square holes in the centre, and afterwards covered on the top by separate slabs of marble, decorated with a star, or in some such way as to suggest that in olden times an embroidered curtain had been drawn over these openings when the sun was too strong or the weather too rough. It had been thought that something of the same sort might have been extended into the cella; but probably archæologists were wrong on that point. Pausanias, in speaking of the Heraion at Olympia, said that a little before his time, when the roof of the Heraion had fallen into decay, and it was determined to repair it, they found the body of an armed man in his armour between what he called the sloping roof that supported the tiles of the temple and the roof which was meant to be ornamental, apparently the horizontal ceiling. Pausanias conjectured that the man had been wounded while fighting from the roof of the temple, and that he had crawled between the roof and the ceiling and there died. It was possible that he might have pulled off some of the tiles on the roof of the temple and crept in, but it seemed to him (Dr. Murray) that possibly there might have been some clearstory arrangement which would have enabled a man to get between the roof. He mentioned the point once to Mr. Fergusson, who said that he would cite it in favour of his clearstory view. He had great pleasure in seconding the vote of thanks to Dr. Dörpfeld.

Mr. Wyatt Papworth said he wished to say a few words about the tiles which had been mentioned, and he wished to call attention to a paper read by his brother, in 1866, entitled "Suggestions respecting the Roofs of Temples called 'Hypæthral.'" His brother was the first to call attention to the subject, and to suggest that the roofs of the temples of Ægina and Bassæ were covered with such tiles. The word "tiles" had been used, but as we only know tiles 10 in. by 6 in., or so, in London, it should be mentioned that the "tiles" of the Parthenon were 2 ft. 3 in. square, whilst the tiles of the temple of Epicurius, at Bassæ, were 3 ft. 6½ in. by 2 ft. 1¼ in., and 1⅞ in. thick. Few remains of such "tiles" existed. There was in the British Museum a small tomb, on the roof of which were openings similar to those which had been described, and there were other examples mentioned in the paper referred to. Mr. Fergusson, in his last book, had used two or three examples showing that mode of lighting. If these tombs were formed in imitation of the hypæthral temples it would carry out to a great extent the idea of the perforation of the tiles.

The President asked what was the material of the tiles?

Mr. Papworth said they were of marble. There was a passage in Pausanias in which Byzes of Naxos was mentioned as the inventor of such tiles. That system of roofing got to Athens, where the tiles became much improved. He was rather inclined to form his own notion that the temples were lighted partially in that way, and not altogether through the doorway; although he was very much impressed with a passage which he read in some writer with regard to the temple of Abou Simbel, where, one morning in the year, the light of the rising sun passed through the doorway, and lighted up the figure at the extreme end of that very long tomb. He thought that neither the author of the paper, nor Professor Aitchison, had quite impressed upon them the passage in Vitruvius referring to hypæthral temples, which clearly stated that the temple was "open under heaven," which, in his judgment, meant that there was a clear space right up to the sky. Some authors had tried to show how that opening could be covered in a few minutes in the case of rain, and how the statue could have been protected from intense heat.

Dr. Murray desired to add a word with regard to the tomb in the British Museum mentioned by Mr. Wyatt Papworth. He knew that tomb very well, and had seen it in company with Professor Aitchison and others. It did not strike him as affording an illustration in corroboration of Mr. Papworth's views. It was a marble tomb, with a roof which had no indication of tiles upon it. A very small opening was made very near the ridge at one of the pedimental ends, and a similar opening diagonally at the other end. These openings had been covered with small panels, which fitted tight and rested on ledges. What purpose they might have served was not clear. They might have served as openings through which to deposits offerings to the dead, but they did not strike him as looking like reproductions of any system of lighting buildings from the roof.

Mr. R. Phené Spiers said he thought it was possible, as had been suggested, that some amount of light was obtained in the naos by covering the coffers of the roof with slabs of semi-transparent marble.

Professor Aitchison said that although Pausanias described with some minuteness the details of the interiors of the temples he visited, he did not say how they were lighted or at what hour of the day he visited them. After Fergusson published his theory of the lighting of the Parthenon, M. Charles Chipiez wrote a pamphlet on the subject in 1878, and he instanced the Temple of Jupiter Panhellenius at Ægina as a strong proof of Fergusson's theory being right, for he told us that M. Charles Garnier found the remains of bright red on the flutes of the upper columns, but none on the lower ones; and he accounted for that by saying that the light coming in from the back of the upper columns made the fluting imperceptible, and therefore they were obliged to make it visible by a very bright colour. Pausanias said that the Temple of Apollo, at Bassæ, was roofed with stone; but that may have merely meant the sanctuary where the statue of the god was. Some of the temples that Vitruvius spoke about were hypæthral, not because they were so designed, but because there were no funds to roof them.

Mr. Stannus and Mr. J. M. Brydon having made a few remarks,

Mr. Penrose again spoke in reply to certain questions which had been asked. One was with reference to the existence of staircases up to the roofs of temples; there was no doubt about that. There was one very good, very well-preserved staircase in the Temple of Concord at Girgenti. He had been up and down it with great ease, and there were the remains of several others; but one example in thoroughly good condition carried the point. Where Dr. Dörpfeld spoke of the roofs being covered with loam as well as other things, he seemed to derive that from an inscription no wise differing from a specification of a building connected with the harbour at Piræus, in which loam was mentioned to be used in connexion with the tiles. Those tiles were probably terra-cotta tiles, and it was quite possible that loam was also used in roofs covered with these great marble tiles. In Athens they were not of the ordinary Pentelic marble, which was of a comparatively close texture, but were always of Parian marble, which was remarkably transparent; and therefore there was a great probability of that marble having been used to light the interspaces of the roof to some extent. But he doubted whether any appreciable light could have come through openings in the lacunaria after having been transmitted through the semi-transparent tiles. Vitruvius most distinctly spoke of the interior part of the temple being open,—his words were "*in interiori parte*,"—so that involved his simply confining his attention to that part, the naos only; and in some temples,—certainly at Branchidæ, near Miletus, and probably at the great temple at Agrigentum and at the Temple of Jupiter Olympius at Athens, was entirely open to the sky; but when Hadrian put up the statue, and the pedestal on which it stood, he would have covered it to protect it. There might have been on the whole roof very sufficient windows opening close to the ridge, which would have admitted all the sunlight that was necessary to shine fully on to the naos. He could not think that so much labour would have been expended on the cryselephantine statue and other works of art if they had only been intended to be seen by the people outside at a very great distance, because the distance would have been quite 200 ft., and the whole temple was about 350 ft. long.

Mr. W. Kidner said that only those who had lived in tropical countries were aware how much light can be let into a building through a small aperture.

The President, in putting the vote of thanks to Dr. Dörpfeld, coupled with the name of Prof. Aitchison, remarked that the subject was one in respect to which no amount of discussion would ever lead to a definite conclusion. Perhaps it was as well that that was so, because, if they could arrive at a conclusion, they should lose one of the most interesting subjects of speculative inquiry.

Professor Aitchison having said a few words in reply, the meeting terminated.

The next meeting of the Institute will be held on Monday, January 9, 1893.

THE ARCHITECTURAL ASSOCIATION.

The fourth ordinary general meeting of this Association was held on Friday, the 16th inst., in the Meeting-room of the Royal Institute of British Architects, 9, Conduit-street, the President, Mr. H. O. Cresswell, in the chair.

Mr. C. W. Wallis was elected a member, and Mr. E. S. Gale, the senior honorary secretary, announced that the Royal Institute of British Architects had presented their new volume of "Transactions" to the library of the Association. A vote of thanks was accorded to the Institute.

The President said he desired to call the attention of students to the lectures in the Fourth Division on the history of architecture, which had now commenced.

Mr. F. Inigo Thomas then read a paper on "The Formal Garden," which we print in other of our columns. [See p. 496.]

The President said that the Committee had invited Mr. W. Robinson to attend that evening as the representative of the landscape gardeners. He regretted that that gentleman was unable to attend, but he had sent a few remarks on the subject, in the form of a short paper, which the honorary secretary would read.

Mr. Gale then read Mr. Robinson's paper, which was as follows:—

A Few Words on Garden Design in relation to "Formal Gardening."

Let me thank the Association for allowing me to say a few words on this subject. I will confine myself to existing things, and not speak of old books, which have little bearing on the present state of gardens. The architect is a good gardener when he makes a

beautiful house. That is a thing for which one must ever be grateful. Whatever is to be done or considered afterwards, one is always helped and encouraged by its presence. On the other hand, scarcely any amount of skill in gardening softens the presence of an ugly building. No one has more reason to rejoice at the presence of good architecture than the gardener and planter, and all stonework near the house, even in the garden, should be dealt with by the architect in every part. Such, at least, is my view. But when architecture goes beyond the strictly necessary round the house, and seeks to replace what should be a living garden by an elaborate tracery or pattern work, then I think error and waste are at work, and the only possible result is ugliness. The proof of this is at Versailles, at the Crystal Palace in great part, in the old gardens in Vienna, at Caserta, near Naples, where there is a far from beautiful stone garden. One may not so freely mention private places as public ones, but many ugly and extravagant things have been done by trying to adapt a mode of garden design essential in a country like Italy, where people often lived for health sake on tops of the hills, to gardens in the plains and valleys of England. I know of a terrace in England built right against the house, so as to exclude the light from and make useless what were once the reception-rooms of a great house! That deplorable result came about by endeavouring to adapt Italian modes to English conditions, and was the work of Sir Charles Barry. To anyone really interested in the question, one of the best places to consider it is the upper terrace at Versailles, looking from the fine buildings there to the country beyond, seeing how graceless and inert the whole vast design is, how the clipped and often now dying, because mutilated, yews thrust their ugly forms into the landscape beyond and rob it of all grace. To those who tell me this sort of work is necessary to "harmonise" with the architecture, I say no, there are better ways; to rob fine buildings of all dignity and repose by a vast geometrical "pattern" is the worst way. Where formal gardening is done on a large scale, its cost and maintenance are monstrous. The uses and construction of any building made to be lived in secures it the care without which it cannot long exist. Even with the support of a State like France the repair of elaborate stonework in gardens is an endless and almost impossible task, as anyone may see who visits frequently that vast extravagance, Versailles. Nearer home we may see something of the same kind near the huge stone basins of the Crystal Palace. Is it in the interest of architecture that noble means should be so wasted? As the cost and difficulties of the finest work in building increase, the more the need to keep it to its true and essential uses, especially in face of the fact that half the houses in England require to be rebuilt if our architecture generally is to prove worthy of its artistic aims. I delight more than anyone I know in walls for my roses, and build walls, provided they have any true use as dividing, protecting, or supporting lines. I am not afraid of a straight walk, but very much prefer it in many cases. To take advantage of sunny sheltered corners in and about our old or new houses and make delightful little gardens in and near them, as were made at Haddon, Powis, and Drummond Castle, is quite a different thing from cutting of the landscape with vast formal patterns. I cannot call them gardens. I find it implied by some writers on this subject that "design" can only concern formality, —an extraordinary statement. The artistic massing and giving picturesque effect to groups and groves of oak, cedar, or fir is far higher design than putting trees in lines. There is more true and subtle design in Richmond Park and many noble parks in England, where the trees are grouped in picturesque ways, and allowed to take natural forms, than in a French wood with straight lines cut throught it. In the old days when designers dealt with but a few trees, and in many countries not a trace of landscape garden existed, it was well to carry the only formal and "decorative design" into the garden. Now a totally different order of things has arisen, because we have tens of thousands of beautiful things coming to us from all parts of the temperate and northern world, and people who know these things will not accept a book design, such as Nesfield adopted at South Kensington, instead of our lovely and infinitely varied garden flora. The trees of California, Oregon and Canada alone form a tree garden in themselves, and it is absolutely impossible to lay out gardens of any size or dignity without a knowledge of those and all other hardy trees, not only in a cultivated but in a wild state where possible. If anything demands special study it is that of garden design with our present materials. If that art is to be mastered the work of a life must be given to it, and, more than that, a life's devotion. No less, I presume, is the sacrifice his own art requires of the architect. I do not ask favour for any one way of my own or of others. There is no such thing as a style fitted for every situation. Only one who knows and studies the ground well will ever make the best of a garden. Any "style" may be right if the site fits it. I never see a house, the ground around which does not require treatment, suited to itself only. A garden in many of the districts about Naples is impossible without much stonework to support the earth. In the neighbourhood of London or Paris such necessity seldom exists. But these considerations never enter into the minds of men who plant an Italian garden in one of our river valleys, where, in nine cases out of ten, an open lawn is often the best thing before the house, as at Bristol House, Roehampton; Greenlands, Henley-on-Thames; and in many gardens in the Thames Valley. So, too, there are right and wrong ways in formal gardening. Haddon, simple, right, and charming on the one hand, and Chatsworth on the other. Knole and Ightham and Rockingham without a single yard of stonework not absolutely needed for the house and its approaches, and others with a fortune spent in vast display of costly stonework absolutely needless and only effective in robbing the foreground, of a fine landscape of all repose and picturesque beauty,—or even shutting it out altogether, as has not seldom been done by a needless terrace-wall. It is worth noting that many of these terrace-gardens out of place shut off the house from the landscape near. That I need not say in the case of a beautiful house is often an irreparable loss. The idea in some minds that the old style of building in England was always accompanied by elaborate formal gardening is proved to be erroneous by many beautiful old houses. The Elizabethan house had often an ample lawn in front, or plenty of grass near, as, for example, at Wakehurst. Such houses are quite as delightful in effect as the old houses and castles where terracing was necessary and right, owing to the ground, such as Naworth, Berkeley, Powis, and Rockingham. Large formal gardens are by no means a necessary accompaniment of our finest domestic architecture. Of this there are many instances among the finest old English houses, Tudor and Elizabethan. The idea that trees must be clipped to make them "harmonise" with architecture is a mere survival. In the old days of garden design, when in any northern country there were few trees in gardens, it was, perhaps, expedient to slash these trees into any shape that met the designer's view. But now that many beautiful trees and shrubs are coming to us from many countries, the aim of true gardening is, so far from mutilating them, to develop their natural forms. In by far the greater number of beautiful places in England, from Knole to Haddon, and from the fine west-country houses to the old border castles, there are many of the fairest gardens where the trees are never touched with shears! Sutton-place, near Guildford, built, I think, in 1521, is one of the most beautiful old houses in the home counties, and its architecture is none the less delightful because the trees near show their true natural forms and are *not* clipped. It ir also an example of a fine old house around which there is no elaborate stone garden,—and where none was required. It would be as hopeless to design a building without knowing anything of its uses or inhabitants, as design a garden without full knowledge of its nobler ornaments. Trees and the many things that go to make our garden flora vary much in form, habits, and hardiness, according to soils, situations, and districts. Errors of the most serious kind arise from dealing with such things without knowing them well. Any attempt to keep the gardener out of the garden must fail, as it did in our own day in the case of the ridiculous broken brick and marble flower-beds at South Kensington. Except for what is mostly a very small area near the house, the architect and garden-designer deal with distinct subjects and wholly distinct materials. They should work in harmony, but not seek to do that for which their training and knowledge has not fitted them. If a genius should arise who will master and practise both arts well he will deserve our sincerest felicitations!

Mr. Leonard Stokes, in moving a vote of thanks to Mr. Inigo Thomas for his paper, said he could not pretend to anything more than an amateur acquaintance with the subject. Mr. Thomas seemed to lay down distinctly that there might be two things surrounding one's house: either a park, or a garden; but Mr. Robinson seemed to think that there should be a park only. Of course, they were only speaking of large houses. Mr. Robinson apparently objected to having a small part of the park set apart as a formal garden. He (the speaker) did not see why they should not have both. Because Mr. Thomas liked to see clipped trees in his garden, he had no desire to clip every tree in the neighbourhood. One of the greatest charms about a fine house was to have part of the grounds laid out in a fine way. If the landscape was inclined to be varied in itself, he thought it would add greatly to the charm of the whole to have part of the ground laid out in terraces and regular forms, but, of course, it depended a great deal upon the circumstances. If one had not a formal house to begin with, he did not think it was desirable to have a formal garden; and if one had a picturesque old house that had been altered and added to, and partly pulled down and rebuilt, he thought they wanted a garden something in the same style to harmonise. They did not want a large geometrical design laid out in front of a picturesque house. In the case of a large mansion with regular wings, he thought that the garden ought to be laid out in a formal way; but when they had an irregular house, on an irregular site, he did not think the situation called for a formal garden. Nor was it possible to provide anything in the way of formal gardening in connexion with an ordinary villa; the plot of land available for villa and garden was altogether too small. Perhaps Mr. Thomas could give them some information as to the cost of making these formal gardens. For instance, he understood that one could purchase yew hedges, so many feet high, at so much per foot run. He had seen formal gardens in which part of the arrangement was laid out in parti-coloured broken marble. One could have formality and vulgarity, just as one could have formality and good taste. At the same time, he thought that if the client insisted, it would be possible to have a picturesque garden in good taste. In conclusion, Mr. Stokes referred in terms of high commendation to the excellent pen-and-ink drawings with which the lecture was illustrated. Most of the drawings had no doubt been seen in their published form in Messrs. Blomfield & Thomas's book, but they probably had not seen the originals, which were very beautiful specimens of penmanship.

Mr. Shuffrey said he had much pleasure in seconding the vote of thanks to Mr. Thomas. He thought that it was very fortunate that the subject had lately come under the notice of architects very much, and was being thrashed out, for he thought there was no doubt that the subject was one which ought to be treated by architects. To build a house and leave it on the ground without any consideration of its immediate surroundings seemed to him to be entirely wrong. He did not think that some of the old prints which were exhibited helped the cause of the formal garden. In looking at the illustrations of Hampton Court, the thought would be "How monotonous it must be to traverse the whole of those paths before getting into the open country!" He thought that Hampton Court and Versailles, and other large places, gave them the formal garden in its exaggerated development, and he thought that Mr. Robinson, in mentioning Versailles, had seized one of the examples where the enormous size militated against the interest of the place. The difficulty of treating smaller sites with a formal garden had been touched upon by Mr. Stokes. There was no doubt that if one had to apply the same conditions to a small site, one had to have a very firm hand, and to be content with very little treatment; and that was a thing which the ordinary gardener would not be satisfied with. To take a 50 ft. plot, 200 ft. long, with a house in the middle, and there was not much to be done in the way of formality. In planning trees, sufficient consideration was not given to the ultimate shape

which the trees would take. They were planted too thickly together, and in a few years' time it was found that they could not grow together. Then began the clipping, and they got a number of round shapes of various sizes jumbled up together. If formality in the treatment of trees was to be carried out successfully, it must be considered from the initiation of the design. There was the difficulty that the work took so many years to get any result from, that the client was disposed to dislike to have to wait so long. He was afraid that if we had the yew hedge that Mr. Stokes referred to, and bought it from the nurseryman, it would not keep out the wind. It was only by keeping them close together, and clipping them for a number of years, that those pleasing warm and dark colours which they were all so fond of were produced. In books published of late years on the subject, particularly in that by Mr. Sedding, many illustrations were given of fantastic forms of clipped trees. That was a matter of taste, but when it got to be fantastic he thought it ceased to be pleasing, and caused the practice of clipping trees to be ridiculed.

The President, in putting the vote of thanks, said that he agreed with Mr. Stokes in saying that everything must be considered on its merits. That applied to gardens as well as to anything else. He thought it was impossible to lay down any guiding rules as to the way in which a garden should be laid out. He thought that Mr. Thomas, by exhibiting to them certain illustrations of gardens, had very clearly shown all that could be done in regard to the treatment of varying sites. From the book lately published by Mr. Blomfield and Mr. Thomas one could get a great deal of useful information. He thought it was impossible to lay down any hard-and-fast rule for the treatment of gardens. There was one difficulty in reference to the illustration of gardens which had always struck him, and he thought that Mr. Thomas had shown the way out of the difficulty, and that was how to show them on drawings. If one made a plan of a garden, it was somewhat uninteresting, and to the person unaccustomed to the study of plans, it meant nothing at all. The favourite method formerly seemed to be the old-fashioned bird's-eye view, but it had the defect that we were not birds, and could not possibly get the *coup d'œil* from any point of view. Mr. Thomas had adopted a different method, and had given the effects to be obtained at different points of the garden, as one saw them in walking round. The addition of a plan would be of assistance, as it would show the means by which the different effects were produced. Having referred to Evelyn's garden at Wotton, the President said that immediately surrounding the house there must be a certain amount of formality. As Mr. Stokes had said, a very large and regular house seemed to suggest a formal arrangement, while a picturesque house did not. The clipped yews seemed to be the principal thing objected to by Mr. Robinson, who waxed very merry over the fantastic shapes which they were sometimes made to take. He told them that the yew-tree, left to grow in its own natural way, was a very beautiful object. They were aware of that, for many of them had seen fine yew-trees in churchyards; but it seemed to him that that statement of Mr. Robinson's somewhat begged the question, because yew-hedges were made with a definite object and purpose, viz., that of providing shelter. He had much pleasure in putting the vote of thanks to Mr. Thomas, with which he should like also to couple the name of Mr. Robinson for so kindly sending them his ideas on the subject.

The vote of thanks having been agreed to by acclamation, Mr. Inigo Thomas briefly replied, one of his observations being to the effect that it was not necessary that a formal garden should be a large one, for some of the most beautiful of the old formal gardens which had survived were small,—mere cottage gardens, in fact.

The meeting then terminated.

University College, Liverpool, &c.—Mr. George Wragge, of Salford, writes to say that in our notices last week of the opening of the University College at Liverpool, and the Cathedral Extension, Manchester, we omitted his name from our lists of sub-contractors, and he asks us to mention that he made and fixed the whole of the wrought-iron casements for the former building to Messrs. A. Waterhouse & Son's instructions, and also the gun-metal casements for the latter work. The omissions were not ours.

ON FORMAL GARDENS.*

In dealing with the surroundings of a building, there are, nowadays, held to be two ways. That is to say, I believe it is so with the generality of the public, if the small section who style themselves "architect" are not altogether in accordance with the rest. The most approved method at present is, in the words of a recent writer on the subject, "to take true cognisance of nature's means for the expression of beauty, and so dispose those means artistically as to co-operate for our delight in given conditions." I hope you all fully understand the meaning of this, since for my own part I am bound to confess that I do not quite fathom the deeper subtleties of the phrase. But, then, I cannot bring to bear on the subject such a keenly analytical mind as some of you no doubt will. The writer is a "Landscape Gardener," and this is a definition of his method, but if we turn to the actual work of the landscapist we find on examination that his stages of procedure are something as follows:—Here is a house to which we are to add beautiful surroundings. First, "take cognisance" of the natural undulations of the soil. If there are none we must proceed to make some. Here is a door; make a path to it, but take care that your path does not preserve a straight line for any distance from the house. If there is a slight depression in the ground, it may well follow the course of it, but if not its course may be arbitrary, only it should be made to appear to be otherwise by a mound raised in the loop of the path, on which a rhododendron bush may be planted with effect when we come to that part of the "design." It may be mentioned here with advantage that to the landscapist the word "design" is synonymous with the word "intention"; and anything that is designedly done is *ipso facto* design. But to continue,—this is the front door and requires a carriage approach. Some people might say it would be stately and dignified to bring the drive straight across the park through an avenue of elms, but, perhaps, it will be better to wind up through the new plantations, thereby avoiding an early view of the house and making the park appear larger than it really is. In the matter of planting it will be necessary to order from the nursery specimen trees of all kinds whose natural habitat is any quarter of the globe rather than England, and disperse them with due consideration so that each tree will form a foil to the next. It is a matter for congratulation that the house is placed on the summit of a hill, for, though it may be a trifle exposed to the wind, yet an extensive view is to be obtained without any exertion on the part of the occupants. The lawn will afford a convenient space for the exhibition of the rarer specimens from the nursery, and especially those that have the more difficult Latin names, since such information will tend to make a lasting impression on your friends. You might with advantage make a lake in the bottom there, curving its banks to represent nature, and so concealing the end that your friends will mistake it for a river.

This is the spirit in which the landscapist approaches his work, and it is just this indefinite intention that I wish to combat so strongly. Mr. Richmond said in a recent paper of his read before the Art Workers' Guild that our art lacks virility nowadays, and, if this applies in the arts of which he was speaking, it certainly holds good in the matter of gardening and building also.

In the first place, the origin of the word "garden" is "garth," meaning an enclosed space. Of course, it may be said that one cannot claim a forgotten meaning for any word, but in this respect it is on a par with several other English words by comparison with which I hope to make it clear that the original is the true meaning, and that it is only forgotten by those who have given little or no thought to the subject. Take the word "etching," for instance. How many people there are who have never yet awoken to the fact that an etching is anything more than a pen-drawing pure and simple? If one makes so bold as to explain that to "etch" is to eat, a puzzled expression steals over their faces, which is apt to expand into a broad smile of incredulity. And further, it is hardly necessary to remind you how altered is the meaning of the term "architect," and, as Mr. Jackson has pointed out, that of "surveyor," too. Now if we wish ourselves to be understood, we must surely be more precise in these matters, and if necessary, start afresh with a definition of terms. Suffice it to say, that of all things my conception of a garden is an enclosed space, and among the characteristics of the formal garden, I think you may safely put enclosure at the head of the list. No matter what the form of this boundary; each enclosure will be a separate garden in itself. Hence the plural term "gardens," which, if applied to the work of the landscapist, has no meaning at all, since his scheme (if so it may be called) wanders on indefinitely, without let or hindrance, except for such weak bounding lines as are afforded by an iron railing three bars high, or a sunk fence.

In the old engravings the garden-courts are sometimes figured with reference to a note, in which case we find them described individually by such terms as "west garden," "base-court," "parterre," "coronary garden," and the like. But the walls and hedges that were employed for this were not only of use in keeping distinct the various kinds of gardens.

In 1701, we read in Defoe's "Tour,"—"The Pond-garden [at Hampton Court] was laid out into small enclosures surrounded by tall hedges to break the violence of the winds and render them proper for the reception of such exotics in summer as were moved out of the conservatories during the season." And Mr. Baring Gould, in his book on "Old Country Life," comments on the capital shelter that these garden-courts afforded. Mr. Elgood, too, a painter whom some of you may know as particularly favouring this kind of subject, was telling me that while he was making studies for a picture at Arley, in Cheshire, he was astonished to find how effectually the tall yew-hedges protected him from a violent wind that was blowing outside. For this purpose yew is certainly the next best thing to stone or brick, and in some respects even better. A wall is more monumental, but, if unsympathetically built, will never give a chance to all the wealth of vegetation that makes the charm of an old wall. Again, a wall is not so hostile to a flower-border as a yew-hedge, for the yew, being a greedy plant, sucks much of the good from the surrounding soil that ought to go to the flowers. But against this, it may be said that there is no finer background for flowers than the sombre green tapestry of yew, and there is no better protection from wind than is to be obtained by the filtering property of a thick hedge. And besides the actual use these divisions are for shelter, they also have a sentimental charm in the idea of seclusion and mystery that they give to the ground so divided. I know of nothing more suggestive of hidden beauties, and more stimulating to the imagination, than a glimpse of sunlit lawn with stately flights of steps that is sometimes caught through an open garden door.

Given the enclosure, in my ideal garden formality goes a little further. The paths are straight, or at least geometrical. The flower-borders enclosed with a trim edging of box, and the fountain has its softly-moulded rim of mossy stone. The turf is level as a table, and whatever standard yews are necessary to emphasise points in the design will be clipt into quaint shapes as shall suit my fancy. But inside the borders and over the walls, flowers and creepers run riot.

From the works of the landscapist, one would judge that, having made his borders irregular in outline, he feels that his responsibility is ended, as it seemed to be a matter of indifference to him whether they are planted with formal lines of flowers or not. The beds so planted in the London parks are of use to inform us how even in size certain plants can be grown if properly tended, but there the interest ends, and we begin to wonder whether after all the game is worth the candle. In short, I think it should be evident that the lanscapist's garden is no garden at all, but merely a wilderness, and in bringing his wilderness next to the house he is not only reversing the time-honoured usage of our forefathers, but is acting contrary to what must appear to be reason to all those who value decency and order. It is evident that his vaunted natural treatment of the ground is not natural, but only slovenly artifice, and I would go so far as to put forward the apparent paradox that it is most natural for

* A Paper by Mr. F. Inigo Thomas, read before the Architectural Association on the 16th inst., as elsewhere mentioned. (See p. 494, *ante*.)

man to be artificial. However, it would take more time than I have at my disposal to-night to discuss this part of the subject in all its branches, and perhaps it is hardly worth while to spend more time in trying to enlist any waverers on the side of formality and order. This term, "formality," carries with it now an implied reproach, so that one would prefer to use the word "regular" in the place of "formal" when speaking of gardens, since perhaps it offends the ear rather less.

The history of the early gardens in England is a little enveloped in obscurity. In the old MSS. they appear to be referred to rather as fruit-orchards than flower-gardens. For example, in the office of the Duchy of Lancaster is preserved an account rendered by the bailiff of Henry de Laci, Earl of Lincoln (who died in 1312), of the profits arising from, and the expenditure upon, the Earl's garden in Holborn, then in the suburbs of London, in the twenty-fourth year of Edward I. £9. 2s. 3d. in money of that time,—equal to about £135 of modern currency,—was received in one year from the sale of fruit alone. This tends to show that profit was the main object with which the garden was kept up, though, perhaps, it is hardly fair to take an instance that would of necessity be affected by the proximity of the metropolis. Alexander Necham evidently had in his mind the idea of a garden for pleasure when he said that a "noble garden" should be arrayed with roses, lilies, sunflowers, violets, and poppies. But probably much ingenuity was not shown in the design of gardens until the fifteenth century, when fountains and conduits begin to grace the pages of illuminated manuscripts. We hear of an early garden at Westminster and another at Windsor, but at first the flowers seem to have been a secondary consideration to fruit and vegetables. I should not, of course, advocate on this score the expulsion of flowers from the fruit-orchard or fruit from the flower-garden,—far from it,—as I think the combination of the two is very charming, and fruit fresh plucked from the tree has all the added sweetness that a flower has newly gathered from the parent plant. Nothing could present a more perfect picture than the fruit-garden of the Hospice at Laon, in Normandy, with its clusters of Tritoma echoing the golden glow of apricots, and relieved by the soft blue blouses of the men as they paddle about barefoot with brimming cans of water from the fountain.

It was the growing popularity of the game of bowls, requiring, as it does, a broad expanse of level turf that paved the way to the great plaisaunces of a later date. As to whether terraced or hanging gardens existed here in early times we are left rather in the dark. Many people seem to suppose that this method of treating the ground was the direct result of Italian influence; but as I am not aware that falling ground has ever been the private prerogative of the land of sunshine, I am inclined to think that it is just as likely to have been the rule here as in Italy. These good people are apt to be blind to the very essential differences between an Italian and an English garden. They ignore the preponderance of turf to gravel, the habit of growing more plants in beds than in tubs—the restraint in the matter of statuary, and the peculiarly English colouring that is given to the whole by our northern climate and materials. And even if, after all, we are bound to admit foreign initiative, why, pray, should we call our gardens Italian, if we feel our buildings of that time to be so essentially English that we have had to call them Elizabethan?

The privy purse expenses of Henry VIII. give us a good deal of information with regard to his gardening operations. These, with the help of a contemporary picture or two, and some little imagination, may conjure up for us a fair idea of the Royal garden of that time.

It appears to have been framed on a comparatively small scale, walled in and divided into four compartments by gravel paths, and the borders protected by barber-poled railings with a royal beast holding a flag at every corner. A part of it is to be seen through the doorway in a picture now at Hampton Court, but the view is very much curtailed by the figure of Jane, the fool, who is standing in the doorway. Mr. Ernest Law is inclined to think this garden was at Whitehall, but wherever it was it probably represents the more ornate garden of the period.

The garden at Nonsuch was, perhaps, much in the same state as at the time of Henry VIII.'s death, when it was described by an eye-witness, in 1650, as follows:—

"It was cut out and divided into several allies, quarters, and rounds, set about with thorn hedges. On the north side was a kitchen-garden very commodious and surrounded with a brick wall of fourteen feet high. On the west was a wilderness severed from the little park by a lodge, the whole containing 10 acres. In the Privy garden were pyramids fountains and basons of marble, one of which is set round with six lelack trees, which trees bear no fruite but only a very pleasaunte flower * * * Before this palace was a neate and handsome bowling green surrounded with a balustrade of freestone."

All through the reign of Elizabeth her courtiers were vying with each other in the splendour of their palaces and gardens, and John Thorpe shows a design for one among his drawings at the Soane Museum. He notes, by the way, that there is to be "nothing out of square." Hatfield, Longleat, Hardwicke, and all the grand buildings of that most stately period had similar surroundings. Their arrangement was, with infinite variation in detail, something as follows:—Between the projecting wings of the house on the entrance front a space was paved in stone or marble, with a few steps leading down to a gravelled court with walls on the side connected with the house. This was called the "forecourt," and often had a fountain in the centre between the porch and entrance gateway, with garden doors on the other two sides, as you may see at Montacute, in Somerset. Before arriving at this court there was in many cases a sort of ante-court, which seems to have been for dignity solely. In those days it was not the custom for guests to alight at the front door. Dinner being at about 12 noon, and bowls after, they would arrive in riding-dress probably, and dismount at the outer gate, approaching the house across the court on foot. Then those were the days of thick shoe-leather, broad-brimmed hats, and heavy cloaks that defied the rain. To one side of the house, and a little apart from it, stood the stables, with a kitchen-court between them and the house. This was called the base-court, and in it was hidden away all the untidiness that is consequent on the proximity of kitchen and stables. In this connexion it is worthy of note that these Elizabethans,—perhaps the finest type of men that England has ever produced,—did not think the stable buildings, or even the home-farm, unworthy of forming a continuation of the house itself. Nowadays, we are so highly civilised that our sense of smell and notions on hygiene have banished the farmyard and stables into the next county, and connected up with a telephone. For my own part, I have a decided predilection for stable and farm smells, and what country home is complete without the rattle of stable-buckets and the busy hiss of grooming? On the other sides of the house lay the more ornamental pleasure-gardens, under which head comes the "parterre," the bowling-green, the "coronary garden," "herb-garden," &c.

Perhaps the best contemporary account of an Elizabethan garden given with any regard to detail is to be found in a letter written by one of the officers of the Court to Master Humphry Martin, mercer, of London. It is dated from Kenilworth, 1575, and describes a visit of Queen Elizabeth to the Castle and, *inter alia*, the gardens. In front of the Castle was a terrace walk raised 10 ft. above the garden and 12 ft. wide; at either end were arbours "redolent by sweet trees and flowers," and along the balustrade, on the garden side, obelisks, spires, and coats-of-arms in stone were set out at equal distances. Below this terrace was the garden, an acre or more in extent, divided into four quarters by fine sanded walks. In the centre of each plot rose an obelisk of red porphyry with a ball at the top. The garden was planted with apple trees, pears, and cherries. In the middle of the wall opposite the terrace was a great aviary, 30 ft. long, 14 ft. broad, and 20 ft. high, and in the centre of the garden a fountain of white marble rose out of an octagonal basin, "where," in the words of the writer, were "pleasantly playing to and fro carp, tench, bream, and for variety perch and eels—a garden then so appointed, as wherein aloft upon sweet shadowed walks of terras, in heat of soomer, to feel the pleasaunt whisking wynde above, or delectable coolness of the fountain spring beneath, to taste of delicious strawberries, cherris, and other fruits even from their stalks."

John Evelyn, to whom we are indebted for much information on the subject, had always had it in his mind to write a great book on garden design; but, unfortunately for us, he never got further than the headings of the various chapters. Among these, however, are references to the stage properties of the garden grandeur of his time, quite enough to show how much of garden lore has been entirely forgotten. In Book II. he proposed writing of "Knots, parterres, compartments, bordures, and embossements, of walks, terraces, carpets, and allies, bowling-greens, maills, their materials and proportions, of groves, labyrinths, dadales, cabinets, cradles, pavilions, galleries, close walks, and other relievos; of fountains, cascades, rivulets, piscinas, and waterworks; of rocks, grots, crypts, mountains, precipices, porticos, ventiducts; of statues, columns, dyalls, perspectives, pots, vases, and other ornaments."

From this it is evident that through the latter half of the seventeenth century garden design had been making great progress,—though Charles I. had not done much to encourage it, leaning, as he did, rather more to horticulture than design. Neither do we hear of a great deal being done under Charles II., though he it was who dug the canal at Hampton Court and made the garden at St. James's. Perhaps no apology is needed for rather frequent allusions to Hampton Court, since to study the history of the various changes there is to follow the course of design in all its branches from Tudor times downwards.

It is difficult to arrive at a very clear idea of the development of garden design up to the time of the Dutch influence, because it was not till then that engravings of country seats drawn from bird's-eye point of view became common. A Dutchman named Knyff was employed at the end of the seventeenth century to make surveys of many places in different parts of England. This he effected with marvellous accuracy, and handed over his drawings for engraving to a fellow-countryman, Jan Kyp, their joint efforts being published in a large folio entitled "Brittannia Illustrata." From this time forward it becomes an easy matter to trace the course of design. Kyp continued for some thirty years to engrave subjects of a similar kind for various publications, notably Harris's "History of Kent" and Atkyn's "Gloucestershire." After his death, in 1722, his mantle seems to have fallen upon John Harris, who engraved some of the drawings by Badeslade in "Thirty-six Views of Gentlemen's Seats in Kent." This Badeslade was an indifferent artist, as may be gathered from some drawings by him now at Mount Edgcumbe, showing the grounds there as they appeared in his time. I have here an old survey of the country round Delft, in Holland. It is the work of Peter Schenk, an etcher of Amsterdam, who lived about 1690. With infinite care he has drawn every ditch and dyke in that part of Holland. That this man was an artist in every sense of the word is evident from the exquisite drawing and subtle biting of the globe in one of these plates. And in making his survey he has evidently taken the keenest delight in following out the intricacies that occur in the regular gardens that lie scattered over the country. At that time, Holland, seen from a balloon, would have, no doubt, appeared much as it is represented here,—in form at least, if not in colour. And if we consult the diary of Celia Fiennes, a lady who was riding through England for her health in the time of William and Mary, we shall find every reason to suppose that it was much the same in our own country. To illustrate this point I will read to you a few extracts from her diary, which, it may be of interest to note, has only lately been exhumed by a descendant of hers from a lumber-room, in which the manuscript had lain ever since it was written. Miss Fiennes has no pretence to style, and writes in an odd inconsequent way; but I will give it you *verbatim*:—

"Epsom is 15 miles from London. There are great curiosities in cut hedges and trees almost before all doores.

They have trees in rows which they cut up smooth, and about 3 or 4 yards up they lay frames of wood in manner of a pent house, so plat the branches on it and cuts it smooth. They leave the stem of the tree to run up, and then cut it clear to the top, which they cut in round heads. . . . . There are several good houses in or about Epsom. Sir Thomas Cooke's house has an enclosed walk before the gate, with swinging gates at

each end and a larger in the middle. . . . . The garden is in forme as Mr. Ruth's first flatt, but larger, with a larger fountain walled in with freestone, a pedistal with little Cupids and Dolphins and Shells on which are Images, and on the top a Crown made all to spout water. The walls full of fruit. In the middle you ascend several steps to a bank, on which are iron-pointed pallasadoes with gilt top: gates to the same. Here is a large square with green walks and gravell and oval in the middle, with devices of little paths of gravell to cut the grass into shapes, squares, and 3 squares.

In the middle stands a gladiator on a pedistal and on the walls are Cupids at each rising of the walls from the bank.

On the left side is a summer house with paints of the seasons of the yeare.

Thence into another garden for kitchen stuffs and hott beds with convenient houses. From this great flatt you ascend severall stepps at three places equal distance, and then long green walks between borders of strawberries, dwarf trees, and some with green squares sett with Cypress, Myrtle, Yew, Holly cut fine, and flowers. Thus 3 several bancks, the spaces so adorned. Then you pass on to a long green walke, the right side or end is a fine summer house, the bank all along guarded with dwarf trees. This carryes on not only the breadth of the house but the length of the whole ground which is for the other garden for use. And just at the end of the pleasure garden begins a large and long pond or Canal—the length of the walke, which has its banke cut fine. There is another great pond on the right side of the house, and two more in the grounds belonging to t on the left."

All this is sufficient proof of the care and thought that was being devoted to garden design at that time, and I think too of the intelligent interest shown on the part of the public. Miss Fiennes writes as if she was noting the points that would be likely to interest her friends in what she had seen. If we are anxious to know what has happened to all the glorious gardens that she attempts to describe, we must consult the shades of "Capability" Brown, Repton, and the like. For all their vaunted worship of the beautiful they were great sinners in this repect, and demolished every old garden that came in their way. Sir Uvedale Price, perhaps, if he had lived in our own day, would have been a devoted adherent of the formal school; but, having the misfortune to be born in a degenerate age, he was swept along by the tide of public opinion, and small heed was paid to his touching lament over the destruction of his own garden, a mistake he realised when too late to remedy.

The really great schemes for approaches, avenues, and much more that lends dignity to a building were generally due, it would seem, to the architect. In 1699 Sir Christopher Wren made a grand scheme for alterations on the north side of Hampton Court. A plan of this exists in the Office of Works, and shows a great courtyard facing north, with a semicircular colonnade leading up to the centre of the banqueting-hall. From this entrance a vista of some miles in length was to lead northwards, flanked by avenues of trees, four rows deep, on either side. At a convenient distance from the Palace a cross avenue is shown, and at the intersection a large circle, called the "Diana Circle," where now stands the great fountain in Bushey Park. These avenues are all that was ever carried out of a conception that would have made a truly magnificent approach to Hampton Court, which is, of all things, what the Palace most requires. This scheme was on an altogether increased scale to that which was actually carried out on the east side. When Sir Christopher had framed the Churches of Hampton, Surbiton, and Ditton, so as to meet the eye standing in the central doorway of his eastern façade, he perhaps felt emboldened to attempt a still greater stroke on the north side. And Wren was working for a master who was likely to appreciate the extreme grandeur of his conceptions. King William passed much of his time at the Royal Palace of Loo, in Holland, and I have here an engraving of it that will, perhaps, give you some idea of the scale on which it was laid out. Recollections of Loo, coupled with a hope long cherished by the King of rivalling the glories of Versailles, have made Hampton Court what it is, and it is only a matter for regret that the loss of his patron prevented Sir Christopher from completing the whole of his contemplated designs. One is accustomed to be told that Henry Wise was the King's adviser in all these matters, but in reading the accounts of the alterations at Hampton Court during this reign, it is evident that the general conception originated in the mind of Sir Christopher, and it was only the details that were left to be carried out by Mr. Wise.

This progress, which had continued under Wren, with the help of Loudon and Wise, up to the death of William, was succeeded by a decline, gradual at first, but rapidly increasing through the reigns of the Georges, till Addison's scoffs and Pope's satirical verse sealed the fate of the English formal garden. However short of a healthy revival, nothing better could have occurred since design had fallen into the hands of the nurseryman, and the stately old gardens lost their charm when the tender care was gone that had kept them trim and neat. Kent followed, and in the words of Walpole, "Leapt the fence and saw that all nature was a garden." This meant that the old walls were pulled down and so-called Nature allowed to usurp the place of the garden proper. "Capability" Brown next appeared on the scene. He was so-called from a habit of remarking (when he had successfully destroyed all trace of a garden) that "it had great capabilities." This man was allowed extraordinary licence, and no better example can be found of the tyranny of fashion over weak minds than is afforded by the history of gardens under his iron rule. He was the king of the landscape school, and certainly his ideas were not lacking in scale; but he had an innate horror of anything approaching dignity, which led him to cut down avenues and generally mutilate what had taken years of honest labour to effect. Cobham, in Kent, is an instance of his handiwork. Five avenues of limes once radiated from the central front, but four of these fell victims to his mania for destruction. He travelled about England, compiling books of suggestions for alteration of the various places. Coloured sketches of the house and surroundings as they appeared were covered with a fly-leaf, on which he drew his suggestions, *plus* eighty years of Nature's assistance, and other embellishments calculated to pacify his clients, the result being that English parks were enlarged by the addition of the gardens; but the English garden practically ceased to exist. And then, forsooth, we hear writers of the present day (on horticulture, be it observed, not on garden design) claiming the title of "English garden" for the anomalous production that has been in vogue from that time up to the present. "Capability Brown" had as followers in his train Repton and Sir Uvedale Price, who handed on the tradition, such as it was, to the Hughes's, Milners, and Robinsons of our own day. Mr. Milner in a book distinguished neither as an effort in literature or the better qualities of etching, has retold the old story already, so well worn; and Mr. Robinson's publication stands a confessed counterblast to a book on the formal garden in England brought out by Mr. Blomfield and myself. To these three books I must refer you to form an unprejudiced opinion on the subject.

Having given a slight sketch of the rise and fall of garden design in general, you will be anxious to hear something more of the details employed in the realisation of these efforts. Perhaps the principle that seems of most importance after that of enclosure is change of level, and a great deal of variety is to be obtained by close-shaven turf seen at different angles with the light. Whenever possible, it has always been preferred that the ground should fall *from* the house rather than towards it, and though, of course, instances of the former treatment are most usual, still there is a certain charm in the latter, too,—which charm lies more in the view of the house from the garden than of the garden from the house. Tissington, in Derbyshire, and Kilworthy, near Tavistock, afford the peculiar effect that is hinted in Sir John Millais' picture of a garden with the gables and chimneys of an old Scotch manse just visible above the walls. The position chosen for the principal terrace was always, if possible, next to the house. But if, as at Rycott, near Thame, the house already lay low, and new gardens came to be added subsequently, rather than forego the terrace altogether it was raised in masonry at the far end of the garden, and in this case the space underneath formed an orangery. Packwood, in Warwickshire, has a terrace 3 ft. high between the garden and orchard, with steps on either side, and at Hampstead Marshall there still remains an artificially-raised terrace of generous proportions.

Nothing seems to have had such a stimulating effect on the imagination of garden designers as rapidly falling ground. Wherever there have have been these conditions a grand chance had come with them for ingenious device in steps and gradients connecting the various levels. Scotland, being naturally a hilly country, revels in highly imaginative terracing works. The illustration of Barncluith, in Lanarkshire, will give you an idea of a homely instance. The sudden fall of the ground through three successive terraces has a very fine effect, and the curious way in which the steps to the garden-house radiate from the lower door jambs is worth notice. A Scotchman in a tam-o'-shanter cap, a retort from a whisky still, and a coffee-pot and cup, all in clipt box, keep the path company beyond the steps, and touch a note of quiet Scotch humour and good cheer. This is the garden that is referred to in a paper written by Sir Walter Scott in 1827 for the *Quarterly Review*, in which he laments the modern neglect of symmetry and order in favour of the chaos that delights the heart of the landscape gardener.

Terraces were sometimes carried round two or three sides of a garden if the fall of the ground suggested such a treatment. Penshurst, in Kent, has a long terrace down one side of the main garden, and a wide one next to the house. Cusworth, in Yorkshire, has raised walks round three sides of the bowling-green, and Oxenheath, Kent, is shown in Badeslade's view with a terrace running round two sides of the garden next to the house, terminating in a pavilion.

The more fall, within reason, from terrace to garden below the better and bolder will the effect be. Haddon has a fall of 16 ft., Pitmidden, 13 ft., and Newton Ferrers, in Cornwall, 8 ft. At Oxford, the walk on the ramparts forms a sort of terrace to those of the College gardens that lie under the city wall, such as Merton or New College, for example.

Another form of earthwork that is to be found in some old gardens is the mount. It was made square or circular, with sloped sides and terrace walks at intervals, with a railed space at the top commanding a view of the country round. Laland, in his itinerary, speaks of a mount at Wrisehill Castle, in Yorkshire, as "writhen about with degrees like turninges of cockellshells to come to the top without payne." That in the garden of New College still exists,—it is 40 paces square at the base and about 30 ft. high, and though now entirely covered with trees and undergrowth, among their roots may still be found the stones of the steps that led from terrace to terrace, and the kerb that bordered the paths. This mount is engraved in a view of the gardens by Loggan in the seventeenth century, and a view of the garden at Wadham shows a circular mount, of which no trace remains. A colossal figure of Atlas crowned the summit, bearing a globe on his shoulders. The largest mount that I remember having seen is at Heath Hall, Wakefield, and is locally called Mount Tarribyte, but it is on such a large scale that at first sight it is difficult to believe that it has formed a part of any garden scheme.

Bowling-greens were generally square, though sometimes a circular instance is to be found, as at Knole, in Kent, where it was surrounded by tall hedges of hornbeam, with arbours on two sides, and a sort of baldaquin in clipped work over the steps that led down to the house. This green was forty paces across and that at Binghams Melcomb, Dorset, thirty by seventy-four, from which it would appear that dimensions were optional. There is a very curious oval-shaped bowling-green facing the house at Campsea Ashe, in Suffolk, twenty-five paces by fifty-two. A fine, old yew-hedge runs all round it, and from this rise at intervals twenty clipped yew towers, with entrances on the four opposite sides.

Grass alleys of ample width formed another pleasing feature in old gardens, and were bordered with clipped greenery or palisades of fruit trees, throwing a broad, even shadow across the turf. The garden at Hardwicke is divided into four compartments by wide grass alleys, with a circle in the centre, where one would expect to find a fountain or some conspicuous ornament. The end of each vista is set with a statue in lead, and four figures of the fine arts fill niches in the circle. As at Hardwicke, so elsewhere, statuary in stone, lead, or bronze played an important part in garden ornament. I cannot think at this moment of any existing instances of Elizabethan statuary, and I rather fancy that such things were not of common use till a later date. Obelisks, sundials, and heraldic beasts, with, perhaps, a curiously-wrought fountain or two, seem to have formed the stock-in-trade of Elizabethan gardens.

Perhaps of all the features of old garden design, none has called forth such violent in-

vective as the custom of pleaching.* It is generally supposed that it came in with the Dutch influence, but inquiry proves that it was the custom in England from much earlier times than these. On the other hand, it must be admitted that it was under the Dutch influence that it was carried to such excess as ultimately to bring the formal garden into disrepute from this very cause. No one who has tried it will deny that a yew-hedge when clipped gives a much quieter background for flowers than if left to its natural growth. And, as I have said before, the garden designer will feel the need of individual trees clipped into form to emphasise points in his design, but kings and queens carved in yew, or foxes jumping through a hoop, as you may see at Broomehall, in Suffolk, hardly tend to ennoble the whole effect of the garden, and may well be left to those who care for such trifles.

However, at Packwood, in Warwickshire, there is an instance of pleaching that follows out a definite scheme through the whole garden, and commands more serious consideration. The main walks in this garden follow the shape of a capital T, and at the crossing rises a mount, with a tall cone of clipped yew. This was to represent the Mount of Olives, and on it was once a clipped figure of the Crucifixion. The whole arrangement follows out a kind of sacred allegory. At the foot of the mount stand the four Evangelists, and ranged on either side of the grass alleys that form the cross of the T are the twelve Apostles, and the stem is lined with yews to represent the multitude. This is the only garden I know that has a distinct connected idea running through all the clipped work, and is extremely interesting accordingly. Levens, in Westmoreland, has the Kings and Queens of England, and the old heraldic tradition is kept up in the keeper's cottage at Haddon, where the Manners peacock and the Vernon hog preside over hollyhocks and sunflowers. But failing a double interest of this kind, clipped figures are apt to descend into mere trickeries of a clever gardener.

With Tudor times passed away the old custom of surrounding the walls of the house with a moat, and water was henceforward used more for ornament and the breeding of fish than for defence. Of course, there are many instances of moated houses of a later date, but in these cases there is generally a small garden of some kind between the house and the water. A site chosen among the branches of a stream is always picturesque, if not altogether free from ague. It would be difficult to find anything of its kind more beautiful than the old house at Groombridge, in Sussex, when its twenty peacocks are preening themselves on the lawn, with the moat as their mirror. Ightam Mote is well known, and a seat of Lord Romney's in Kent, also called the Mote, is shown in Badeslade's view with the water still lying under one side of the house, which had been modernised in the style of the period. In the dressed grounds water was always subordinated to the general design, and enclosed within marked boundary lines of stone or brick coping. Large sheets of water such as were made at Wrest or Hampton Court were bordered with turf up to the margin, and so is the pond in the garden at Melbourne, and a smaller piece in a charming old garden at Sydenham, in Devonshire. No doubt in the treatment of this the Dutch influence was strong, though, generally speaking, more fall is obtainable in England than with them, and accordingly fountains are more easily worked. These latter were placed at intervals in the lengths of the water which generally stretched away from the house in the centre of some long vista, and a good effect was sometimes obtained by falls at intervals from terrace to terrace, as at "the Mote" mentioned above.

Viviers, or fish-ponds, were often made at a short distance from the house, where carp and other coarse fish were kept, and a "stew," or small tank, at the end of a pond, served to keep apart the fish that were in good condition for cooking. These were placed in the stew after netting the pond, and the rest returned to the larger pools. The operation of filling the stew is shown in progress in an old engraving of a garden at Westerham, about the year 1720. Swans, ducks, and geese seem to have been kept in profusion on the fish-ponds, which cannot have tended to increase the supply of fish.

Perhaps the earliest example of a fountain still existing in England is that with a polygonal basin, that once stood at Cowdray Castle, and has since been moved to Woolbeding, in Sussex. Then there is the fountain at Bolsover, to which I have already alluded as dating, perhaps, from the time of Inigo Jones. The centre piece of the great Diana fountain in Bushey Park has a curious history. It was originally in the grounds of the palace, and formed the centre ornament in the Privy garden, where it was seen and described by Count Moncenys in the time of Charles II. But after this it was taken down, and in 1713 was removed by Sir Christopher Wren to the position it now holds, and a bill is in existence showing that 1,300*l.* were spent in repairs and fixing. It is rather remarkable that so few centre pieces should have survived in the old fountains. No doubt the constant flow of water and the action of frost has had much to do with it, but one often finds the stone kerb fairly complete when the centre has entirely disappeared. That they must have been common in Queen Anne's time is evident from the engravings by Kip, but very few have survived the ravages of time and the passing caprice of fashion.

Statuary is of the greatest use as a foil to the sombre tone of clipped yew or horn-beam, and perhaps stone or lead seems to be more at home in an English garden, as the lichens and mosses that thrive in our damp climate take to them more readily than the smoother surfaces of bronze or marble. In a small garden at Nun Monckton, in Yorkshire, is a terrace walk that overhangs the river Ouse, which is bordered on either side by allegorical figures in lead, with gilded trappings.

The alternation of these with masses of dark yew have a very telling effect. There are some fine figures at Glemham, in Suffolk, that came originally from Campsea Ashe, in the same county,—one of the Duke of Marlborough, and another of Prince Eugène,—stand on the entrance front of the house, and scattered about in the same garden are lead figures of the seasons,— two black slaves bearing sundials and leaden hounds guarding an entrance-gate.

Newton Ferrars, in Cornwall, has two well-modelled figures of Mars and Perseus, and the gardens at Melbourne are alive with Cupids and other figures from ancient mythology. But leadwork was not only confined to figures. In the same garden at Melbourne is a large lead vase, probably the finest of its kind in England. It stands 8 ft. or 9 ft. high, and is supported by crouching apes. A relief of children at play surrounds the body of the vase, while masks, swags of fruit, and a plume of flowers deck the top. The vase at Penshurst is one of a pair that came from Leicester House, which stood on the site of the present Empire theatre. This was probably not an uncommon design, as there are some at Sprotborough in Yorkshire, which were apparently cast from the same mould. But this is not surprising, as it is known that in the last century a maker named Cheere had a yard at Hyde Park Corner in which he exposed such wares for sale. There were lead toads, too, at Sprotborough used to spout water in the fountains, and at Wootton, in Staffordshire, is a lead duck that seems to float on the surface of the water with a jet issuing from its mouth. Though it has a tendency to lie down as old age advances, lead is not so brittle as stone, which may account for our having more examples left than of the latter material.

A year or two ago I thought I would go and see what remained of the garden at Rousham that Pope describes in a letter to Martha Blount. For the most part the design was completely lost and overgrown, but among the underwood I found two Cupids still clinging tenaciously to the necks of some leaden swans on which they had once, no doubt, ridden gaily astride. Stone figures, as I have said, are not common, but the woman bathing, on the fountain at Bolsover, may be taken as an instance of English work, perhaps about the time of Inigo Jones. But in a letter from Major Booke to the Rev. Samuel Ragge, in 1785, this figure is cited as a "Venus in alabaster," which is not unlikely, as that material is abundant in the neighbourhood.

We all know, of course, what capital work England produced in wrought-iron gates and railings during the last century. The impetus in this direction seems to have come from the work of Tijou, a French smith, who made the great screens for Hampton Court that now stand in Kensington Museum, and are falsely attributed to Huntingdon Shaw. Their original position was on either side of the avenue leading to the bowling-green, and it is to be hoped the day will come when they may be reinstated there or in some more suitable position at Hampton Court. Tijou was to have made a set of gates for the entrance to Bushey Park, but for some reason the work was abandoned, and the present gates,—miserably small in comparison to the piers,—were allowed to fill the space that would have been better left to the master hand of the Frenchman. His influence spread all over England, and instances of elaborate wrought ironwork are too numerous to need particularising here. Indeed, each different craft employed in garden decoration would yield subject matter for a separate paper apiece. So, as time is short, and I have, perhaps, detained you too long already, my remarks shall be brought to a close.

The history of a subject of this kind is, of course, only the grammar. It forms, as it were, the rules by which the game is to be played, and that is where we who style ourselves "artists" should differ from those who bear after their names the honourable initials F.S.A. It is not enough for us to know that these things have been, or the exact period at which they were done. The all-important question with us is, what effect had the designer in view, and how may we hope to obtain equally fine effects ourselves? We should not be content to accept all this as mere history without making an effort to influence popular opinion in the direction of a genuine revival from a purely artistic point of view. But the practical difficulties that beset the designer nowadays are manifold and almost insurmountable. In the first place his client being presumably unfamiliar with the history of the subject will be at least surprised if not actually shocked at the suggestion of such a treatment of his grounds. It will strike him that a comparatively small area is to be enclosed, and that the sum to be spent is exorbitant. And it will probably be difficult to convince him that the desired effect can be obtained in a much shorter space of time than if handed over to the landscapist. Moreover, examples of this kind of work not always being ready to hand, there will probably be nothing to which he can be referred in support of the argument. And another obstacle which will loom up as the work is approached more closely, is the extreme difficulty of any exact estimation of the cost. Personally I have found it impossible so far to carry out works of this description in any other way than by schedule, as the field for design is so unlimited that a fairly free hand is absolutely necessary for sucess. A slight fall in the ground or a tree that is to be spared may be quite enough to start the imagination on a fresh flight. So all this points to the absolute necessity for a generous and cultivated client, failing which it would be madness for an architect to enter upon any such scheme. And I fear for many years to come regular gardening will remain the pastime of private individuals. It is not likely that public bodies will awake to its charms till this is once more admitted to be the natural and straightforward way of treating the grounds round a building.

[Some notes of the discussion which followed will be found on another page]

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* We are unable to understand the persistent faith of the revivers of the formal garden that clipping trees is "pleaching" them. "Pleach" does *not* mean to clip; it means to weave, to plait, to entangle; it is used in that sense by Shakspeare in an unmistakeable passage (in "Antony and Cleopatra"); it is used in the same sense by Tennyson, who was a master of Old English, nor do we find it in any dictionary in the sense in which the "formal gardeners" use it. A "pleached hedge" was not a clipped hedge, but a hedge closely interwoven, an idea confirmed, by the way, in another passage in Shakspeare ("Much Ado")—

> "And bid her steal into the pleached bower
> Where honeysuckles, ripened by the sun,
> Forbid the sun to enter:"

i.e., the flowers and stalks were so thickly interwoven as to keep out the sun. The formal gardeners appear to have found "pleach" used with a wrong meaning in some old gardening book, and persist in keeping up the mistake.—ED.

THE KIMBERLEY EXHIBITION.—We are informed that Messrs. Robert Boyle & Son, Limited, have been awarded a Gold Medal at the International Exhibition, Kimberley, South Africa, for their air-pump ventilators and air-inlets. The Exhibition is ventilated throughout with the air-pump ventilators.

Illustrations.

SOUTH PORCH, LINCOLN CATHEDRAL.

THIS drawing, by Mr. John Begg, represents the porch which was built on the south side of the prolongation of the choir of Lincoln, in the latter half of the thirteenth century, as a state entrance for the Bishop. It belongs to the portion of the cathedral which, as everyone knows, constitutes one of the most perfect examples of English Gothic of the Early Decorated period.

The drawing, which we are happy to have the opportunity of publishing, is an excellent example of Mr. Begg's very individual and artistic style of draughtsmanship.

AISLE WINDOW, BLACKBURN CHURCH.

THE subjects of this three-light window are: in the centre light, Moses striking the rock; on the left hand, Abraham offering up Isaac; and on the right hand, Noah's sacrifice. The subjects are surmounted by canopies. The treatment has been kept light and white in effect, to harmonise with the Late period of architecture. The design is by Mr. Ion Pace, and was exhibited at the Royal Academy of this year.

SOUTH AISLE WINDOW, LEIGH CHURCH, LANCASHIRE.

THE subject illustrated is the "Presentation in the Temple." In the centre light is a figure of the Virgin with the Child in her arms, and in the side lights are figures of Simeon and Anna.

In the tracery openings are figures of six virgin saints: Faith, Cecilia, Agnes, Margaret, Catherine, and Barbara.

The window is by Messrs. Shrigley & Hunt, and the drawing was exhibited in the Royal Academy of this year.

A STREET CORNER.

THIS is a sketch of an actual example of an old Dutch street house, worked up into a drawing under the above title, and which certainly forms a picturesque enough corner of a street. The drawing is by Mr. Clarence Coggin, and was exhibited at the last Royal Academy Exhibition.

DESIGN FOR A MEMORIAL CHURCH.

THIS church, the drawing of which was exhibited at the Royal Academy of this year, was intended to be carried out in a pale red brick, a cream-coloured terra-cotta, and a pale green-grey stone for the buttresses, string-courses, pedestals, &c., of the exterior; the statues and bas-reliefs to be in bronze. The interior was to be executed in the same materials, and the nave to have a low-pitched timber roof, the aisles vaulted in brick. The design is by Mr. H. D. Wilkinson.

HOUSE, NEAR AMPTHILL.

THIS house was planned with the object of being able to utilise the drawing and sitting rooms as one, when required, by removing the wooden screens.*

The walls are faced with red brick and stucco over, and the roofs covered with small green slates. The hall and staircase are panelled throughout, and there is a high panelled dado in the principal rooms. E. H. S.

ADDITIONS TO HOUSE, WIMBLEDON.

THESE alterations consist of a new billiard-room and conservatory, additional bedrooms for servants, and the remodelling of the garden front of the present house, the latter work to be carried out in the spring.

Red rubbers have been used for external facings, and the woodwork finished white. Internally, the billiard-room is lined in teak, dull polished, and the mantel-piece in the ingle is of the same material.

Mr. Brasier, of Wimbledon, was the builder, and Mr. Arthur Ardron the architect.

* The plan was sent by the architect, but too late for production.—ED.

ARCHITECTURAL SOCIETIES.

ROYAL INSTITUTE OF ARCHITECTS OF IRELAND.—On the 17th inst. the annual meeting of the Royal Institute of Architects of Ireland was held at 37, Dawson-street, Dublin, Mr. Thomas Drew, R.H.A., President, in the chair. The report of the Council was submitted. It contained the following passages in reference to architectural education:—

"Architectural education—the burning question of the profession of the day—has not been without the anxious consideration of members of Council during the past year. Frankly the Council tell the members that so rapidly has this movement developed, and the organisation of a curriculum of architectural education been effected in other centres of the Kingdom, that the architects of Ireland, taken at a disadvantage, are as yet absolutely without any surmise of how like advantages could be secured for their younger brethren in Ireland So far only have we gone that we have consented—in our allied position to the Royal Institute of British Architects,—to have Dublin nominated geographically as a local centre of an education system, that we have held examinations for probationers of the Royal Institute of Architects. We advise deliberate delay in entering on the education crusade in Ireland until experience is gained of the working of the new organisation in London, Edinburgh, and other centres, and would deprecate crude and chimerical proposals or any proposals for promotion of Architectural Education in our country until the situation is better appreciated."

Sir Thomas Deane, in moving the adoption of the report, said he thought the Institute had arrived at a stage when they could hold examinations for persons qualifying as architects. He believed the Government ought if possible to place buildings above a certain size in the hands of the profession, so long as that did not militate against the public service.—Mr. Robinson, in seconding the motion, expressed disapproval of the system of competition in vogue.—The motion was passed.—The President expressed the loss which the Institute had sustained through the death of three of their members—Mr. Sidney Cox, of Limerick; Mr. A. Denny, D.L., Waterford; and Mr. Wm. J. Symes.—The ballot for the election of President, Council, and officers resulted as follows:—Mr. Drew was re-elected President. Members of Council:—Messrs. S. Symes, J. J. O'Callaghan, J. R. Carroll, G. C. Ashlin, C. Geoghegan, Wm. Mitchell, Sir Thomas Deane, J. L. Robinson, R. C. Miller, Howard Pentland, A. E. Murray. Auditors:—Messrs. R. O'B. Smith and C. A. Owen.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—A meeting of this Association was held at the Birmingham and Midland Institute on Tuesday evening last under the presidency of Mr. W. Hale, F.R.I.B.A. The formal business, which included the election of twelve new members, was followed by a paper on Rouen Cathedral, read by Mr. J. A. Grew, who, after giving a short description of the Cathedral, proceeded to discuss closely the beauties of the exterior. Referring to the west façade he pointed out that, though almost entirely covered with varied and intricate ornament, the main lines and masses are so disposed as to lose none of their importance, and that, as the visitor approaches the Cathedral from the narrow street leading to the place at its western end, it is not the ornament but the finely-proportioned mass and the imposing lines of construction which first attract his attention. Having drawn attention to many special points of interest, Mr. Grew brought a very interesting paper to a close.

EDINBURGH ARCHITECTUAL ASSOCIATION.—The monthly meeting of the Edinburgh Architectural Association was held on the 14th inst. at the Royal Institution, Mr. Hippolyte Blanc presiding. Mr. T. Crichton Fulton, Glasgow, delivered a lecture on the "Electric Lighting of Large Buildings." A cordial vote of thanks was passed to Mr. Fulton for his lecture.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—The Leeds and Yorkshire Architectural Society held a "Social Evening" in the Queen's Hotel, Leeds, on the 19th inst. At the opening of the concert Mr. G. B. Bulmer, the President, presented a silver medal to Mr. Lindsay Grant for his drawings of ancient buildings.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—On the 13th inst., at the ordinary monthly meeting of this Society, Mr. C. J. Innocent presided, and Mr. J. Starkie Gardner, of London, read a paper on "Ironwork," illustrated by limelight slides. The paper reviewed the history of the blacksmith's craft in England, France, Spain, Germany, Italy, and elsewhere from the earliest periods down to the close of the eighteenth century. A communication was read from the local Council of the Registration of Plumbers, asking the Society to use its influence in the direction of having plumbers' work separately tendered for, and ensuring its being carried out by duly certified and registered plumbers.

ENGINEERING SOCIETIES.

THE SOCIETY OF ENGINEERS.—The annual dinner of this society was given at the Holborn Restaurant, on Wednesday, the 14th inst. The President, Mr. Joseph William Wilson, jun., occupied the chair; and amongst a large company present were Sir Robert Rawlinson, K.C.B. (Hon. Member), Mr. W. A. McIntosh Valon (President-elect), Mr. Henry Adams, Mr. Jabez Church, Mr. Charles Gandon and Professor Robinson (past Presidents), Mr. G. A. Goodwin (Vice-President), Mr. S. H. Cox, Mr. Henry Faija, Mr. G. M. Lawford, and Mr. W. G. Peirce (Members of Council); Mr. Alfred Williams (Hon. Sec. and Treasurer), and Mr. G. A. Pryce Cuxson (Secretary), Professor Ayrton, F.R.S. (President Institution of Electrical Engineers), Mr. W. Worby Beaumont, Colonel Harding, Mr. G. T. Rait, and Mr. J. W. Wilson. After the usual loyal and patriotic toasts had been duly proposed and honoured, the chief toast of the evening, "The Society of Engineers," was proposed by W. N. Colam, coupled with it being the names of the President, the Hon. Secretary and Treasurer, and the Secretary. In replying to the toast, the President enlarged upon the rapid progress of the Society, both financially and numerically. At the last annual dinner the year's increase in membership had been stated at 8 per cent.; he was now able to state that the increase for 1892 had been equally good. This most satisfactory state of affairs was mainly due to several causes; the papers which were read at their ordinary meetings were carefully selected, and during the past year had fully maintained the high reputation of the Society; much time had been spent by the authors in their preparation and illustration. The meetings had been very well attended, and the discussions, in which the older as well as the younger members took part, had been increasingly practical and valuable. Then the professional visits, which had always constituted an important feature of their work, had been this year still more popular and well supported. They included the Tower Bridge, the South Metropolitan Gas Works at East Greenwich, the Kingston Sewage Works, the Southwark and Vauxhall Waterworks at Hampton, Messrs. Willans & Robinson's Works, and the Great Eastern Railway Locomotive Works at Stratford. The progress of the Society was largely due to the unremitting labours of the Council generally, and in an especial degree to their Hon. Secretary and Treasurer, Mr. Alfred Williams, whose unabated interest in their financial and general affairs was invaluable; and last, but not least, to the business capabilities and unfailing tact and energy of their Secretary, Mr. Pryce Cuxson. Other toasts followed.

THE LONDON COUNTY COUNCIL:

FAIR WAGES AND CONTRACTS.

A SPECIAL meeting of this Council was held on Friday, the 16th inst, to further consider the Report of the Fair Wages Committee. We gave the text of the Report, and of the recommendations of the Committee, in our last (pp. 478, 479, *ante*), and we now give the forms of "Instructions for Tender," forms of Contract, Schedule, &c., for which we had no space last week. The Committee recommended that all instructions for Tender and Contracts under the proposed new "Standing Orders" (pp. 478, 479, *ante*) should be, respectively, as far as possible, in the following forms:—

"CONTRACT NO. ——.

Instructions for Tender.

* * * *

Tenders must be on the printed form and be accompanied by the forms of Contract and Schedules thereto and Bond. The Schedule of Prices forming the Second Schedule to the form of Contract must be fully priced out, and the Schedule of Rates of Wages and Hours of labour forming the Third Schedule to the Contract must be fully filled up by specifying all the trades which the contractor may require to employ in and about the execution of the Contract, and by filling into the proper columns against each trade specified the rates of wages and hours of labour and rates of wages for overtime (if any) recognised [*and in practice obtained*]

at* the date of the delivery of the Tender by the several Trades Unions of the Districts in which the work is to be done, and for this purpose all work to be done on and about the

, or within twenty miles of Charing-cross, is to be considered as within the District of the London Trades Unions. On this head reference should be made to the Form of Contract and the recitals in that Form. The Tender and accompanying documents filled up as before directed must be enclosed in a sealed cover and be delivered at the offices aforesaid of the Council not later than o'clock on the , 189 . No Tender will be received after that time.

* * * *

FORM OF CONTRACT, SCHEDULE, &C, AS TO WAGES, &C.

Recital.

Whereas on the day of 189 the contractor made and delivered to the Council a tender for [stating purpose and nature of works and amount of tender] and the Council accepted such tender. And whereas the Council, with the intention of preventing the loss and damage which are caused by defective workmanship, and of preventing disputes between the contractor and his workmen, and the consequent delay and loss to the Council, stipulated that it should be, and it was a condition of such tender and acceptance that the contractor should be bound to pay to all workmen employed by him in or about the execution of this contract the rates of wages, and to observe and cause to be observed by such workmen the hours of labour set out in the Schedule hereto, and to perform and observe the stipulations set out in clauses A, B, and C of this contract.

Provisions.

A. The contractor shall at all times during the continuance of this contract abide by, perform, observe, fulfil and keep all and singular the stipulations following, that is to say—

1. The contractor shall pay all workmen employed by him in and about the execution of this contract or any part thereof, wages [*and wages for overtime respectively*]* at rates not less than the rates stated in the Schedule hereto, to which the work relates, and for each and every breach by the contractor of this stipulation, and notwithstanding the condonation of any prior or other breach, the contractor shall on demand pay to the Council as liquidated damages, and not as a penalty, the sum of 5*l.*

2. The contractor shall observe, and cause to be observed by such workmen, hours of labour not greater than the hours of labour stated in the said Schedule, and for each and every breach by the contractor of this stipulation, and notwithstanding the condonation of any prior or other breach, the contractor shall on demand pay to the Council as liquidated damages, and not as a penalty, for each day on which any such breach shall be committed, and for each workman in respect to whom it shall be committed, the sum of 5*s.* per hour for every hour during which, on each day, each such workman shall be employed by the contractor beyond the maximum number of hours stated in the said Schedule, provided that this stipulation shall not be construed to prohibit overtime, if such overtime be in accordance with the rules of the Trades Unions concerned.

3. The contractor shall at all times during the continuance of this contract display and keep displayed upon the site of the works and in every factory, workshop or place occupied or used by the contractor in or about the execution of this contract in a position in which the same may be easily read by all workmen employed by the contractor in or about the execution of this contract, a clearly-printed or written copy of the said Schedule hereto, and for each and every breach by the contractor of this stipulation, and notwithstanding the condonation of any prior or other breach, the contractor shall on demand pay to the Council as liquidated damages, and not as a penalty, for every day during which such breach shall be or continue the sum of 1*l.*

4. The contractor shall, to the satisfaction of the Council, provide and keep proper books, in which shall be correctly and promptly entered from time to time the names of and the wages paid to, and the hours of labour observed by all such workmen as aforesaid, and shall from time to time when required produce such books to any person or persons, whether a member or members of the Council or not, appointed by the Council, or by any Committee of the Council to whom the matter or business out of which this contract arises may have been or may be referred to inspect the same, and allow such person or persons to take copies of, or extracts from such books, or any of them, provided that no person shall be appointed as aforesaid who is carrying on, or who is pecuniarily interested or employed in a business of the same or a like kind as that carried on by the contractor. And for each and every breach by the contractor of this stipulation, and notwithstanding the condonation of any other or prior breach, the contractor shall on demand pay to the Council as liquidated damages, and not as a penalty, the sum of 3*l.*

5. The contractor shall from time to time, if and whenever required by the Council so to do, and within seven days after such requisition, make and deliver to the Council a statutory declaration, stating that all the entries in such books as aforesaid are correct, or in the case of any inaccuracy therein setting forth the details of such inaccuracy, and that all entries required by stipulation (4) to be made in such books, have been made therein to the date of such declaration, and for each and every breach by the contractor of this stipulation the contractor shall on demand pay to the Council as liquidated damages, and not as a penalty, the sum of 10*l.*

B. The contractor shall not, without the written consent of the Council under the hand of its clerk, which consent may be given subject to such conditions (if any) as the Council may think fit to impose, assign or underlet this contract or any part thereof, or make any subcontract for the execution or performance of the said works or any part thereof, and for each and every breach by the contractor of this clause the contractor shall, notwithstanding the condonation of any prior or other breach, on demand pay to the Council as liquidated damages, and not as a penalty, the sum of 200*l.* [*Provided that if, at the time of tendering, the contractor states his desire to sublet a portion of the work not usually done by him, the Council will agree to this subletting to an approved sub-contractor, the principal contractor being responsible for the work being done under the same conditions as if done by himself.*]*

C. Any sum or sums of money which on breach by the contractor of any one or more of the stipulations aforesaid in Clauses A and B, may from time to time become payable by the contractor to the Council as liquidated damages, may either be recovered by the Council from the contractor by action or other legal proceedings, or may be deducted and retained by the Council out of any moneys due or to become due from the Council to the contractor under this or any other contract, or the Council may obtain payment thereof, partly in the one mode and partly in the other.

In case of any breach by the contractor of any one or more of the stipulations aforesaid in Clauses A and B, or of any one or more of the provisions contained in the Schedule hereto, it shall be lawful for the Council, instead of claiming payment to them by the contractor of the liquidated damages payable by the contractor as aforesaid in respect of such breach, to determine this contract in the same manner and to the same extent as they have power to determine the same under clause† in the events therein mentioned, and if this contract shall be determined under this present power, then all the provisions of that clause shall apply as if this contract had been determined under that clause.

* The words in italics within brackets constitute amendments which were agreed to in the course of the discussion of these documents in detail.

† This will be the general clause in the contract giving the Council power to determine it or put the work in the hands of other contractors at the cost of the original contractor.

THE SCHEDULE.

Rates of wages to be paid, and hours of labour to be observed, by the contractor as regards all workmen employed by the contractor in or about the execution of this contract :—

TRADES.	For all work done within a radius of not exceeding 20 miles, measured in a straight line from Charing-cross.		For all work done outside the said radius the rates of wages and hours of labour recognised at the date of the tender by the Trade Unions of the District, in which district such work is intended to be done, viz. :—	
	Rate of wages per hour.	Hours of labour per day.	Rate of wages per hour.	Hours of labour per day.

The foregoing list is believed to include all the trades which the contractor may require to employ in or about the execution of this contract. If, however, he should employ any workman or workmen in any trade not before specified, the rate of wages per hour to be paid to such workman or workmen is not to be less, and his or their hours of labour are not to be more, than the rate of wages and hours of labour respectively which at the date of the contractor's tender were recognised [*and in practice obtained*]* by the Trade Unions of the several districts in which the work is done. Provided always that all work done on a site within twenty miles of Charing-cross shall be considered as done within the district of the London Trades Unions.

6. There shall be inserted in every contract a clause prohibiting the contractor from entering into any subcontract without the consent of the Council, and in granting such consent the Council shall require the contractor to enter into an agreement which will secure the observance of the following conditions, viz. :—

That no sub-contract shall operate to relieve the contractor from any of his liabilities or obligations, and that the contractor shall be responsible for all the acts, defaults, and neglects of the sub-contractor as fully as if they were the acts, defaults, and neglects of the contractor, and that there shall be inserted in the sub-contract a covenant by the subcontractor that he will pay all workmen employed by him in or about the execution of such sub-contract rates of wages not less, and observe and cause to be observed by such workmen hours of labour not greater than the rates of wages and hours of labour following, that is to say, as regards all work done upon a site, any part of which is within a radius of twenty miles, measured in a straight line from Charing-cross, the rates of wages and hours of labour set out in the schedule appended to the original contract as applicable to work done within such radius, and as regards all other work such rates of wages and hours of labour as at that date of the sub-contract are recognised [*and in practice obtained*]* by the trades unions of the several districts where the work is done, and that such rates of wages and hours of labour be inserted in a schedule to the sub-contract, but in no case shall such rates of wages be less or hours of labour greater than those set out in the 3rd and 4th columns of the wages and hours schedule of the contract between the Council and the contractor, and that in case of any breach by the sub-contractor of the covenant as regards rates of wages and hours of labour to be inserted in any sub-contract (and notwithstanding the connivance of the contractor in or condonation by such contractor of such breach or any prior breach) the contractor shall for every such breach as regards the rates of wages on demand pay to the Council, as liquidated damages and not as a penalty, the sum of 5*l.*, and shall for every such breach as regards the hours of labour on demand pay to the Council, as liquidated damages and not as a penalty, for each day on which such breach shall be committed, and for each workman in respect to whom it shall have been committed, the sum of 5*s.* per hour for every hour during which such workmen shall have been employed by the sub-contractor beyond the maximum number of hours during which under the terms of the said covenant he ought to have been employed.

And that the sub-contractor shall at all times, during the continuance of the sub-contract, display and keep displayed on the works and in every factory or workshop, or place occupied or used by the sub-contractor in or about the execution of the sub-contract, in a position in which the same may be easily read by all workmen employed by the sub-contractor in or about the execution of the sub-contract, a clearly printed or written copy of the said schedule; and for each and every breach by the sub-contractor of this stipulation, notwithstanding the condonation of any prior or other breach, the contractor shall, on demand, pay to the Council, as liquidated damages and not as a penalty, for every day during which such breach shall be or continue, the sum of 1*l.*, and that the subcontractor shall, to the satisfaction of the Council, provide and keep proper books, in which shall be correctly and promptly entered from time to time the names of and the wages paid to and the hours of labour observed by all such workmen, and shall, as required, produce such books to any person or persons, whether a Member or Members of the Council or not, appointed by the Council or by any Committee of the Council to whom the matter or business out of which the sub-contract arises may have been or may be referred to inspect the same, and allow such person or persons to take copies of or extracts from such books or any of them, provided that no person be appointed, as aforesaid, who is carrying on or is pecuniarily interested or employed in a business of the same or a like kind as that carried on by the sub-contractor; and for each and every breach by the sub-contractor of this stipulation, and notwithstanding the condonation of any other or prior breach, the contractor shall, on demand, pay to the Council, as liquidated damages and not as penalty, the sum of 3*l.*, and that the sub-contractor shall from time to time, whenever required by the Council so to do, and within seven days after such requisition, make and deliver to the Council a statutory declaration stating that all the entries in such books, as aforesaid, are correct, or in case of any inaccuracy therein, setting forth the details of such inaccuracy, and that all details required by the stipulation lastly hereinbefore contained to be made in such books have been made therein to the day of such declaration, and for each and every breach by the sub-contractor of this stipulation, the sub-contractor shall, on demand, pay to the Council, as liquidated damages and not as a penalty, the sum of 10*l.*

Provided that this Standing Order shall not be construed as prohibiting the sub-contractor without the consent of the Council from purchasing or sub-contracting for the supply of any materials, articles, or things required for the execution of the contract which are ordinarily to be purchased wholesale in the market or of wholesale merchants or manufacturers."

Proposed Selected List of Contractors.

"On July 21, 1892, the following proposal by Mr. Beachcroft was referred to us for consideration and report. That Committees charged with the carrying out of works undertaken by the Council be at liberty to invite tenders from an approved list of persons willing to tender for such works, under the conditions imposed by the Council; such list, however, in no case to contain the names of less than seven persons.

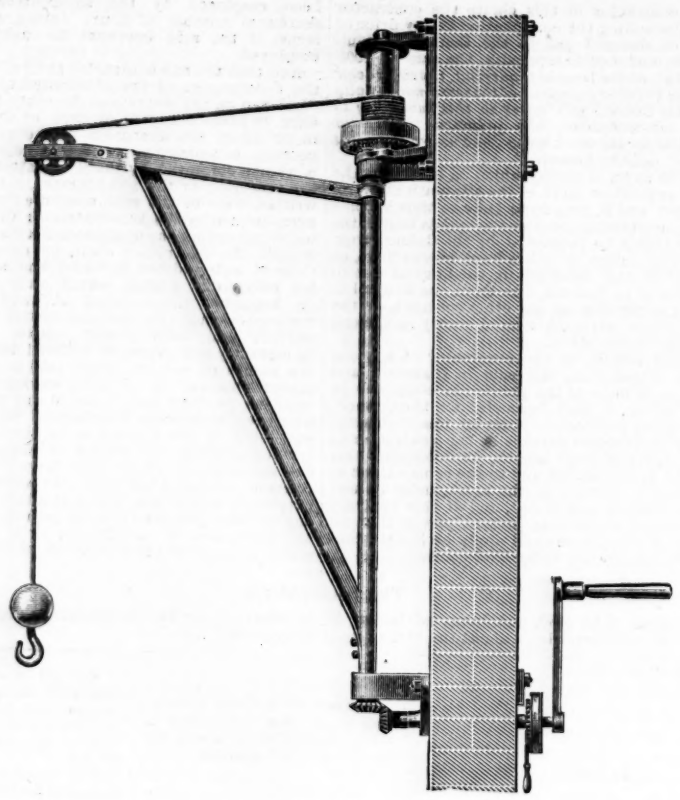
We have carefully considered this proposal and have to recommend to the Council as follows:

'That it is not desirable to depart from the method of obtaining tenders hitherto adopted by the Council.'"

A debate lasting nearly four hours commenced with an unsuccessful attempt to rescind Mr. Frederic Harrison's amendment to insert the words "*and in practice obtained*" in paragraph 2 in Standing Order 1 (see last week's *Builder*, pp. 478, 479). The proposal to rescind was defeated, as were other amendments, and Standing Order No. 2, as amended last week, was agreed to.

On Standing Order No. 3 (see *Builder*, p. 479, *ante*), Mr. Arthur Arnold moved the omission of the words "proved to be." He held that country contractors ought not to be expected to pay London rates of wages.

Mr. Saunders, M.P., expressed the opinion that it would be simply impossible for contractors employing labour at a greater distance



A New Jib Crane.

than twenty miles to fill up such a schedule as that proposed.

After some discussion the Council divided, and there voted—For the amendment, 40; against, 52; majority against, 12.

The amendment was accordingly negatived, and the recommendation adopted.

On Standing Order 4,

Mr. Pearce moved that consideration of this proposition should be deferred until the result of the preceding recommendations had been ascertained.

It was decided to refer the recommendation, and the part of the report pertaining thereto, back to the Committee.

Mr. Ward moved the addition of the following Standing Order:—

"That when there is no trade union to fix a minimum wage the Council itself shall fix it."

Mr. Frederic Harrison, while expressing his accord with this proposition, suggested the addition of the following words:—

"But that there shall not be on the Council's list any rate of wages less than 6d per hour for men, or any hours of labour more than ten hours per day."

At the suggestion of the Chairman, this matter also was referred to the Committee. The Council then discussed and agreed to the form of contract, &c., making certain amendments, most of them consequential upon Mr. Harrison's accepted amendment. These amendments are indicated by italics within brackets in the foregoing report.

At the ordinary weekly meeting of the Council on Tuesday last, there was little or nothing calling for mention in these pages. After sitting for five hours, the Council adjourned until Tuesday, January 17, 1893.

Chicago Exhibition.—The Royal Commission for the Chicago Exhibition are arranging for a series of introductions to the different sections of the Catalogue of the British Section. Amongst those who have promised to contribute articles are: Sir Douglas Galton, on "Railways;" Prof. Francis Elgar, "Ships and Shipping;" Prof. Roberts-Austen, "Metallurgy;" Prof. Le Neve Foster, "Mining;" Mr. W. H. Preece, "Electricity;" Mr. Ernest Clarke, "Agriculture;" Mr. Thistleton Dyer, "Horticulture;" Prof. Ray Lankester, "Fisheries;" Mr. R. Marston, "Angling;" Sir George Birdwood, "India;" Mr. Fuller Maitland, "Music;" Mr. H. Graham Harris, "Engineering;" Capt. Abney, "Photography;" Mr. Reginald Hooker, Assistant Secretary of the Statistical Society, "General Manufactures." The general introduction to the Catalogue will be written by Sir Henry Trueman Wood, the Secretary to the Royal Commission.—*The Athenæum.*

A NEW JIB CRANE.

Handy cranes for light loads to be raised by manual labour are most useful adjuncts to warehouses, particularly those of the smaller classes. Those in current use are generally too heavy and massive, and present another serious defect,—the open hole made in the wall for the chain or rope. This last imperfection is a serious one in corn and other stores, where access of the external weather is liable to do injury to the goods within.

The new jib crane produced by Messrs. Abbott, of Newark-on-Trent, is a most practical contrivance, which remedies or avoids the common defects of ordinary hoisting appliances. It is simple and inexpensive, and is, moreover, perfectly safe in working. Its compactness and lightness cause the least amount of dead-weight on the wall; and, indeed, it can be fixed to an independent upright beam or post if so desired. The woodcut above shows the new crane in its simplest form. The brackets which support and hold the crane externally are bolted right through the wall. Below the foot-plate are seen externally two bevel-wheels. The spindle of the pinion passes through the wall, and is worked by a handle inside the building. The other wheel is attached to a shaft working within the tubular upright of the crane, as in a sleeve. The head of this shaft is connected with a vertical winding drum within the grasp of the top external bracket, which, like the foot-plate, is secured by bolts passed clean through the wall. Everything thus communicating between outside and inside is a close fit, admitting neither damp nor draught. The jib is supported by a stay. The whole gear is made of steel; and of varying capacities to lift from 2½ cwt. to 5 cwt., 10 cwt., and a ton. The handle attached to the pinion spindle being inside the wall, a valuable economy of internal floor-space in the hoisting operation is afforded. For ordinary winding with the handle alone a simple and convenient brake connected with the external drum gear can be put in action by a pull-rope hanging down inside the wall within reach of the hoister. But when the goods require careful treatment, and speed of lift is not required, a worm-wheel can be added, which works with the utmost smoothness and which will hold the weight of goods in operation at any point where they are simply allowed to rest. This worm-wheel works itself out of gear whenever the pressure of the load is relieved by its deposit at its destination. The spindle of the worm-wheel, like all other portions of the crane, is fixed without any open orifice in the wall. The two smaller sizes of the crane are worked by the simple bevel-gearing at quick speed. The two larger sizes have both bevel and worm gearing, either being applicable at will. Nothing can be safer than the worm-gearing, for the load will not run down if ever the handle slips off; but it is too slow in speed for ordinary use, unless where the goods being transferred are liable to damage from shocks.

Books.

Die Mysterien Heiligtümer in Eleusis und Samothrake, von Otto Rubensohn. Mit zwei Plänen und mehrere Abbildungen im Text. Berlin. 1892. Gaertners Verlagsbuchhandlung.

In its original form as a prize essay written for the Kaiser Wilhelm's University at Strassburg, the treatise before us dealt generally with the topographical and architectural conditions of Greek sanctuaries in relation to ritual customs. In republishing his essay, Dr. Rubensohn has wisely cut it down, and limited his subject to material more easily compacted, *i.e.*, to the treatment of the two most important "mystery" sanctuaries of ancient Greece, *i.e.*, Eleusis and Samothrace. For completeness sake, we could wish he had added an account of the Kabeiroi Sanctuary near Thebes, to which, of course, he makes constant reference. As regards Eleusis his work is of special value to the reader, who may prefer his very lucid German to the heavy task of wading through the modern Greek account in the Praktikà and Ephemeris of the Athenian Archæological Society. Plans of the excavations at Eleusis and many isolated particulars have filtered through into guide-books and popular works, but Dr. Rubensohn aims at something much more complete. He gives a full and exact account of each of the successive restorations of the sanctuary, and deals with these restorations in relation to the modifications of ritual that occurred from time to time. Nothing is more tempting than to conjecture in that time-honoured field of hypothesis the "Eleusinian mysteries," but Dr. Rubensohn keeps rigidly to facts,—facts as attested by actual monuments, above all by inscriptions.

Samothrace is dealt with in the same fashion. Probably few educated persons not specialists know anything definite about the ritual practices there, or, indeed, the monuments discovered in Dr. Conze's excavations, though the Niké of Samothrace is familiar to every visitor to the Louvre. Dr. Rubensohn puts his finger at once on an architectural feature that distinguishes all genuine mystery cults. The mystery temple contains within the actual sanctuary a sacrificial *trench;* it is so at Samothrace, it is so at the Kabeiroi sanctuary near Thebes. Ordinary Greek temples have an altar, not a trench, for sacrifice, and this altar is outside the *naos*, not within. The conclusion is obvious,—the trench denotes a *chthonic* worship,—the Kabeiroi worshipped at Samothrace, whatever else they were or were not, are *chthonic* divinities. This is but one example of a method exactly applied through all the various phases and developments of the Samothracian cult down to imperial times.

Account-Roll of the Priory of the Holy Trinity, Dublin, 1337-1346. Edited by James Mills, M.R.I.A. Dublin: University Press.

This was a small but apparently wealthy religious house, for, while the number of the brethren seems not to have exceeded eleven, its income reached something like 260*l.* a year. This would equal in our money nearly 4,000*l.* The roll is interesting, not merely because it throws light upon the cost and character of conventual life in the fourteenth century, but also because we gather a good deal of information from it as to the management of farms, and the payment of workmen. Ordinary labourers were paid 1d. a day; but if permanently employed they rarely received money. Their wages were paid in the shape of allowances of corn, fixed by statute. Carpenters were hired generally at 2d. a day, with board, and smiths at the same rate. The cellarer of the priory enjoyed a good revenue; but though wine figures frequently in the accounts, it does not seem to have been bought in large quantities at any one time. Annexed to these accounts (which have been translated and

annotated by the erudite editor) is the copy of a curious poem or morality, found written upon the unused parts of the roll, and ascribed to the middle of the fifteenth century. It is without a title, but the editor suggests "The Pride of Life" as an appropriate index to its contents.

Labour Contracts: A Popular Handbook on the Law of Contracts for Works and Services. By DAVID GIBBONS. Fourth Edition. By T. F. ATTLEY, Solicitor. London: Crosby Lockwood & Son. 1892.

THIS is a sensible book, but as it has now reached its fourth edition it needs no long notice in these pages. It is, in fact, a work upon what may be called contracts for work and contracts for service, as, for instance, contracts between a house-owner and a builder, and contracts between a house-owner and his servant. At the end will be found various statutes relating to these subjects, such as the Factory and Workshops Act, 1891, and some useful forms of agreements and contracts. In fact, the book is a handy and compact volume, with much legal information. Should another edition be published, we would recommend that the index be enlarged. For example, there is in the book a certain amount of information as to arbitration, but in the index, under the head of "Arbitrator," we find only "Arbitrator, fee of, 109," which is singularly meagre. Again, it would facilitate the use of the book if marginal notes were inserted by the side of the text. This often saves much time when reference has to be made to a work of this kind.

Paving and Making Good Private Streets. By WILLIAM SPINKS, A.-M.Inst.C.E. Third edition. London: E. & F. N. Spon. 1892.

THIS is the third edition of a very practical and useful work. It is an exposition, in plain terms, of the 150th section of the Public Health Act, 1875, which empowers Urban Authorities to compel the paving, &c., of private streets at the expense of the adjacent owners. Probably no clause in this famous Act has caused more litigation; and the light thrown upon it by the interpretations of the various Courts forms an excellent sarcasm on the English law.

The principal ambiguity of the clause rests upon the definition of a street given in section 4 of the same Act, and we cannot help being reminded by it of the railway passenger who took a tortoise into the carriage with him, and was asked to produce a ticket. On his refusal, the station-master was appealed to, and he gave the following judicial decision, dismissing the case: "Dogs is dogs; cats is dogs; and monkeys is dogs; but tortoises is insects!"

The work has been carefully brought up to date, and the various amending or modifying clauses and cases excellently arranged.

Medum. By W. M. FLINDERS PETRIE. London: David Nutt. 1892.

THIS is the last of the annual volumes which, for several years past, Dr. Flinders Petrie has published to record the results of the previous year's explorations in Egypt. After having investigated various sites of varying dates, he proposed to himself, in 1891, the task of examining the peculiar-shaped pyramid in the midst of the cemetery at Medum, about forty miles to the south of Cairo. This is well known for its supposed remote antiquity, the intention being to search for the most ancient of Egypt's monuments in order to determine, as far as possible, the origin of some of the types and conventional forms so common in the works of later date, and so familiar to students. The cemetery contains a great number of tombs, among which the sepulchre of Nefermat, with its remarkable sculptures, is the best known, while the lofty pyramid close to it, rising high above all surrounding objects, is a conspicuous feature above the sandy plains, not only on account of its height, but from its broken summit and the peculiar steps, which give the monument a curiously unfinished aspect, and which, as has been proved by the excavations, strangely transform the original appearance, although they are now shown to indicate the mode of construction.

Having collected many of the workmen of previous years, Dr. Petrie took up his abode in Nefermat's sepulchre, and proceeded to make an excavation of considerable size in the mass of rubbish and fallen material which entirely cover the base, and which rise to a considerable height around the pyramid. We are given some graphic details of the nature of this heavy work and of the character of the workmen, who, working piece-work at 1d. to 1¼d. per cubic yard, according to the hardness of the ground, will yet, man and boy, earn together 1s. 6d. to 2s. per day between them; and with only the poor local implements will move from 15 to 20 cubic yards as a common day's work. We are sorry to hear that these wages are about double the Fellah's usual rate of pay.

Search was first made for the small temple which appears to be a constant adjunct to all these structures, and which was found beside this pyramid, doubtless one of the first that was erected. It was found nearly perfect; it proves to be the earliest dated building in the land at present known, and it has survived all the various rebuildings and vicissitudes of the other Egyptian monuments. The date, which applies equally to the bulk of the pyramid, is made out indirectly. There is neither ornament nor inscription upon the original work, but there are various additions in which the founder, Senefern, is mentioned. These are not alone of the Eighteenth Dynasty, but in periods nearer to his own time. Senefern is a well-recognised king of the Fourth Dynasty; and the later Egyptologists have assigned the all but incredible period of about 4,000 years before Christ to his reign,—a date which, it must be remembered, is that of the creation of Adam, according to the usual chronology.

The dates assigned to Egyptian antiquities naturally have been, and will be, challenged, and there are important differences of opinion among Egyptologists; but the student soon becomes convinced, from the clearness of the records on the solid granite of the buildings themselves, that the usually recognised dates assigned for the beginnings of things have to be set back materially,—so far, at least, as Egypt is concerned. The value of the book before us is greatly enhanced from its unfolding to us a clear record of the condition of the human race in Egypt, and of their proficiency in the arts and of their mode of daily life at this remote period.

The pyramid has been found to be an earlier counterpart of the Great Pyramid at Gizeh, and erected in the same ratio of proportion of height to circuit. It has the same angle of inclination,—namely, 51 degrees and a few minutes. The Temple is on the east side. The height has been 301 ft. 7 in., and the bases 473 ft. 6 in., there being a small discrepancy of a few inches only in the lengths of each side. The sides face the cardinal points. The workmanship is excellent, showing remarkable proficiency on the part of the artificers. But the angle of inclination does not appear. It has only been disinterred by Dr. Petrie from the mass of ruin fallen from the summit. The upper part, where it has not been removed,—for the monument has been used as a quarry by the later kings,—shows various faces of worked stone, one below the other, and laid at an acute angle. These afford to our author the secret of the original construction. The pyramid is found to have been erected around and above the primitive mastaba which encloses the sepulchre. A mastaba is a low, flat-topped structure,—in this case, as in many others, with sloping sides. Its form, it need hardly be said, preceded that of the pyramid. In this instance it has been covered over with successive layers of stone, of which seven have been counted, at a somewhat later period, parallel to the acute slope of the sides, and finally the whole was covered by the flatter slope already referred to. In the pyramid at Gizeh, erected by Senefern's successor, and in later ones, the intermediate slopes were omitted. The pyramid was surrounded by a peribolus wall, traces of which alone were found. The sepulchre within the pyramid had been rifled in some remote period.

Several of the tombs in the vicinity were examined, and outside one of them, with sloping sides, an outer surrounding wall was found, on which were drawn at each of the angles the sight lines to guide the workmen for the formation of the sloping sides of the building. In another the author tells us how he copied the paintings, not with wet paper, as others had previously done in part, to the great injury of the colours, but by a system of tracing on dry paper. The paintings entirely cover the walls, and the mass of work involved can readily be conceived. The sheets were afterwards put together, and the results are before us, some of the many plates being prepared by process from these actual drawings.

The tools used by the workmen were of bronze, of usual type,—adzes and chisels have been found. But there is no indication of infancy in any of the arts. All are found in full development on this prehistoric site. These are the earliest works yet found of this remarkable people. The commencement of things appears as far off as ever!

The book is full of minute details of the discoveries made, and its pages, enriched by a goodly number of plates, many in colours, reveal the forms of the pottery found, the earliest shapes of hieroglyphics, the designs of ornamental columns, and a mass of information which comes to us as a revelation of the remote past. The beauty of the objects found would alone make the illustrations of interest, but the extreme antiquity of the objects will cause this volume to be sought after by everyone who takes an interest in the early history of the human race. It has to be added that the whole of the plates are from drawings made by the author, who has evidently worked as hard in the preparation of this volume as he must have done to recover the results from the buried mass. There are chapters on the inscriptions found by F. Ll. Griffith, on the varieties of ancient "Kohl," by Dr. A. Wiedmann; on the colours by Dr. W. J. Russell, F.R.S., and on the Papyri of Coptic date, by W. E. Crum.

We commend this most interesting and important book to the attention of our readers.

NEW DIRECTORIES.

"The Post Office London Directory for 1893" (London: Kelly & Co., Ltd.) is the ninety-fourth appearance of that bulky and indispensable compilation. It is, as usual, corrected close up to date of issue, and an improvement has been effected by colouring the new map, showing the boundaries of postal districts and the course of the main arterial roads at a glance. The mistake which we pointed out last year in the name of the new park between North Brixton and Camberwell has been corrected on the map, and instead of "Ingall's Fields" it now reads correctly as "Myatt's Fields." The price of the directory is 32s.

"The Australian Newspaper Directory" (London: Gordon & Gotch) is now in its third edition. It is a very useful handbook, giving the names of Australian and New Zealand journals and of the towns where they are published, and containing several maps and statistical and other notes about the Australasian colonies. Messrs. Gordon & Gotch are so well known in connexion with Australian newspapers that the directory may be accepted as reliable.

ALMANACKS AND DIARIES FOR 1893.

Messrs. Hudson & Kearns, of 83, Southwark-street, send us, as usual, a parcel of their excellent diaries for the use of architects and builders. We have so often spoken favourably of the merits of these productions that it is unnecessary here to expatiate upon them. We can especially recommend "The Architect's Diary," Nos. 12 and 13, "The Builder's Diary," No. 11, and a useful general "Diary and Note-book," No. 9. They are all full of useful information, and are well arranged and printed. The same firm also send us some specimens of their calendar and date-indicating blotting-pads, in various sizes and styles, but we prefer those with the white blotting-pads, for in our experience the pink pads are a little lacking in absorbtive power.

"Quantity Surveyors' Tables and Diary," for 1893, "revised and re-written by A Fellow of the Surveyors' Institution" (London: Metchim & Son) is a very useful little book for the pocket. It is clearly arranged and indexed, is well printed, and gives nearly sixty pages of memoranda which will be found very useful to architects and surveyors. It is sold for 6d., or with leather cover, 1s.

"The British Almanac and Companion" for 1893 (London: The Stationers' Company) contains, besides the calendar, astronomical notes, and the usual contents relating to public offices and departments, a list of Acts of Parliament passed in the last Session, with abstracts of the more important ones. There are also lists of County officers, the year's Obituary, and infor-

mation as to State pensions, emigration, and the government of foreign countries. Mr. R. Langton Cole contributes his usual review of the Architecture of 1891-2. At the outset he refers to the "art, or profession?" controversy, and expresses the hope that however the dispute may be settled, neither the artist nor the practitioner will be, by official regulations, exalted over the other. "The public," he says, "has need of both, and perhaps likes best the man who best combines the qualities which each deems indispensable." The article enumerates and describes the principal London and provincial buildings commenced or completed during the year. Mr. Cosmo Monkhouse reviews the Art, Mr. Joseph Knight the Drama, Mr. R. Langton Cole the Engineering, Mr. T. Percy M. Betts the Music, and Mr. E. W. Maunder the Science of the year 1892. The price of the "Almanac and Companion" is 2s. 6d.

"The Railway Diary and Officials' Directory for 1893" (London: McCorquodale & Co.) provides, for a shilling, a large amount of authentic and official information concerning railway management and statistics. It contains lists of directors and officers of all the independent lines of railway in the United Kingdom; the weekly traffic returns for 1892, with blank columns for filling in those of 1893, abstracts of four half-years' accounts of some of the principal companies; and a great variety of other information likely to be useful not only to shareholders, but to busines men generally. The "Railway Almanack," published at the same office, is a useful sheet for the wall.

"The City Diary, 1893" (London: W. H. & L. Collingridge, *City Press* Office) is the thirtieth annual issue of a very useful diary, almanack, and handbook. It contains a great deal of information (not so readily to be found elsewhere) relating to the Corporation of London and City institutions and officers. It also includes a list of City parishes and churches, with the names of the clergy and vestry clerks. It contains much other business information, and the diary is interleaved with blotting-paper. It is sold for a shilling.

"Calvert's Mechanics' Almanack and Workshop Companion" for 1893 (London and Manchester: John Heywood) is the twentieth issue of a very useful little book, full of notes and memoranda. It is sold for fourpence.

Chubb & Son's Lock and Safe Company send us a specimen copy of a neat and well-got-up pocket-diary which they are issuing gratis to architects, bankers, and others.

Correspondence.

To the Editor of THE BUILDER.

DRAWINGS OF SIR C. WREN.

SIR,—In the number of the *Builder* for September 12, 1891, was inserted a memorandum of mine relating to "The Family of Sir C. Wren." While looking through the list of books in Sir John Soane's Museum, a few days since, I observed a small, bound volume containing the sale of coins and other antiquities, the property of his son, and sold by order of the executors. In the first day's sale were inserted the drawings of Sir Christopher. I formerly found a reference that a "Sale of Drawings" was effected on October 26, 1748; I cannot refer to the authority for this date, which is some months earlier than that of the catalogue; and of this catalogue I herewith send you a copy of the title-page, as well as of the lots, deeming the whole to be of much interest. Most of the lots are priced; and these prices appear to me to be as insignificant as if the drawings had been sold at the present day. What are they worth now? I do not know if the list has been before printed. Some member of the profession who has seen the collection at Oxford might be able to say if any of the lots are deposited there. Perhaps those not priced may have been bought by another purchaser, and should be found elsewhere. Possibly there were two sales of drawings,—1748 and 1749.

"A Catalogue of the Genuine and Entire Collection of Curious Greek and Roman Medals and Medallions in Silver and Brass, Antique Marble Statues, Busts, Urns, and Inscriptions, Bronzes, Gems, and other Curiosities of Christopher Wren, Esq.; Late of Hampton Court, Deceas'd; together with the Collection of Drawings of Architecture of the late Sir Christopher Wren, his Father, which will be sold by Auction, By Mr. Langford (By Order of the Executors), At his House (late Mr. Cock's) in the Great Piazza, Covent Garden, On Tuesday, Wednesday and Thursday, the 4th, 5th, and 6th of April, 1749."

The collection was on view from Friday, 31st March. There were 94, 86, and 84 lots respectively.

Drawings of Architecture by Sir Christopher Wren.

Lot 30. Eighty-two Designs and two Prints of St. Paul's Church (most part), pasted into a Portfolio. (19s.)

Lot 31. A Hundred and fourteen large and finished Drawings of St. Paul's, Bow, and other Churches in London; also the Monument, Whitehall, Winchester Castle, Trinity College, Cambridge, &c., and three Prints; all pasted into a large Book. (2*l.* 10s.)

Lot 32. Thirty-two very large Drawings of Whitehall, Windsor, and Greenwich Hospital, in a Portfolio.

Lot 33. A Book of Astronomical Schemes.

Lot 34. An hundred Drawings and Sketches of London Churches, in a Portfolio.

Lot 35. Sixty-six Drawings of Hampton Court, all pasted into a Book. (3*l.* 1s.)

Lot 36. An Hundred and two Drawings and Sketches of Kensington Palace, and Miscellaneous Architecture, in a Book. (11s.)

Lot 37. An Hundred and one ditto, in a Cover. (1*l.* 5s.)

Lot 38. An Hundred and thirteen ditto, in a Portfolio. (6s.)

Lot 39. Sixty-nine ditto, of Hampton Court, Warwick Church, and other Buildings, in a Cover. (5s.)

Lot 40. Seven large finished Drawings of St. Paul's, one of the Monument, and a Ground Plan of London after the Fire. (2*l.* 3s.)

Lot 41. A large Portfolio containing finished Drawings of the Hôtel des Invalides at Paris; all pasted in, except two.

Lot 42. An Hundred and Fifty Drawings and Sketches of Winchester Palace and Miscellaneous Architecture; with a Parcel of Papers relating to the Subject, in a Portfolio.

Lot 43. A Large High-finished Drawing of St. Paul's.

Lot 44. A ditto of the Inside of St. Paul's.

Lot 45. A long ditto of an Intended New Palace at Westminster. (2*l.* 4s.)

It would be desirable to trace the whereabouts of Lot 44; it might show distinctly what were the intentions of the architect in regard to internal decoration. Lot 30 may comprise the series of drawings now at the Chapter-house under the care of Mr. Penrose.

WYATT PAPWORTH.

December 7, 1892.

ORIENTATION OF CHURCHES.

SIR,—Having obtained an Ordnance map of the 1-500 scale of the survey of 1879, it is there seen that the axis of the south aisle of St. Mary's Church, Truro, points about 5 deg. to the south of east.

As there is no day, so far as I can ascertain, of several set apart to St. Mary the Virgin (for that I am given to understand is the Mary alluded to), on which the sun's azimuth at rising is 5 deg. south of east, it is therefore suggested that, as that is its rising point for St. Michael's Day, the Perpendicular masons, whilst dedicating their building to St. Mary, were influenced by the position of the foundations of an older building, so that their work, as well as that of the nineteenth century Cornish cathedral, whose axis is parallel with the aisle of the church, is oriented for St. Michael's Day.

This suggestion is based upon the idea that the original Mediæval builders so laid down the axis, in setting out the walls of a church, that it should point to that place upon the horizon where the sun rose upon the day of the saint to whom they were about to dedicate the building.

That this was invariably the case would, it is thought, be difficult to prove, for this reason amongst others, that much confusion has probably been caused by re-dedications, but the three following instances, selected from about forty churches which have been noted recently, tend to show the existence of such a rule as has been referred to.

The three churches alluded to are dedicated to St. John the Baptist, viz., the parish churches of Wellington and Heathfield, Somersetshire, and the priory church of Llanthony, Monmouthshire, and the orientation widely differs in each case.

At first sight this might seem to confirm the suggestion made in a standard work of reference, not thirty years ago, "that orientation has had no graver origin than carelessness, ignorance, or indifference," but a closer examination, it is thought, will support quite an opposite view.

The church of Wellington, as taken by the compass, and allowing for the magnetic variation westward, has a bearing of about 38 deg. to the north of east, which is about the true azimuth of the sun at rising on June 24, the Nativity of St. John Baptist, and there is a further local reference to the same personage by a town-fair being held on that day.

The church of Heathfield, which was formerly in the patronage of the Prior and Brothers of St. John of Jerusalem in London, has a bearing, as taken by the compass, of about 14 deg. to the north of east, which corresponds with the point of sunrise on August 29, the day on which St. John Baptist was beheaded.

The priory church of Llanthony has a bearing of about 5 deg. to the south of east, as taken from the 1-2500 Ordnance map of the Survey of 1880, and this latter observation requires a little explanation, as the Conception of St. John Baptist, September 24, a day not found in the Anglican Calendar, but in another, seems to be the day referred to.

On this day the sun rises about 2 deg. south of east, but if the increasing error of the Julian mode of reckoning is taken into account, it will be found that early in the twelfth century, at the date of the building of the church, it amounted to nearly six days, so that the bearing of the sun at rising on September 24, at that period, would be about 5 deg. instead of 2 deg., if the correction had been made, south of east; and that there was a reason for following the day indicated by the civil year, instead of correcting it to agree with the natural year, will be shown presently.

The parish church of Llanthony, which adjoins the ruins of the priory, and was formerly connected with them, is dedicated to St. David. The bearing of its axis, as taken by the compass and corrected, is about 12 deg. south of east; therefore the building is oriented for March 1, St. David's Day.

Here it is thought that David, the patron saint of Wales, built a cell early in the sixth century, and spent a probationary period in solitude before he became Archbishop of Caerleon-upon-Usk, and transferred his see thence to Menevia, the present St. David's.

The name Llanthony in its first syllable indicates in Cymric an inclosure, a church, and it has been held that the whole is a corruption of *Llan Dewi nant Honddû, i.e.*, church of David in the Vale of Honddû, the latter word signifying Blackwater, being the name of the adjacent stream in this Valley of the Black Mountains.

Here, possibly on the actual site of St. David's cell, William, a military retainer of Hugh de Lacy and Ernisius, Chaplain to Queen Maud, retired A.D. 1103, and built a church where shortly afterwards was settled a Priory of Canons-regular of the Order of St. Austin, dedicated to St. John Baptist, of which Ernisius became first prior. The chancel of the present parish church probably constituted the whole of the first church, as is indicated by its Orientation and in other ways; the present chancel archway being its western entrance doorway; and the nave added later.

It is remarkable that these canons, while retaining the original church, and perhaps, on account of the supposed sanctity of its site connecting it with their infirmary, should not have placed their buildings generally, and their much larger and handsomer church, the outline of which can still be traced, parallel with it, but at an angle which, according to the map, differs by about 7 deg. from the bearing of St. David's Church.

As there is apparently no other reason but that connected with orientation, why the monks, instead of making all the buildings parallel to each other, built them on two converging lines, it is instructive to notice that when they seemingly determined to connect St. John Baptist with the Priory Church instead of St. David, they selected one day of three, dedicated to the first-named saint, and that not in the Anglican Calendar, which would produce the least difference of angle between the two axes, and further, by not correcting the error in the Calendar for September 24, early in the twelfth century, they reduced that difference, although still expressing it sufficiently to show their meaning, to about 7 deg.

J. HOUGHTON SPENCER.

Taunton, December 10, 1892.

COLOUR COPYING.

SIR,—With reference to the point raised in your last issue about the permanency of the colours and inks used in the new industry, it is, as you say, a matter of the first importance, and as such it has had our serious attention. We claim that, after a great deal of trouble, we have arrived at a solution of the problem, and that we are now supplying colours and inks which are practically fast and permanent.

W. DURRAN,
Secretary, Colour Copying Co.

ANTHRACITE COAL.

SIR,—Before pursuing this matter further, perhaps I may be allowed to explain my position. I am not a monopolist in anthracite, nor have I any desire to create a "corner" in that product. My interest as a general coal dealer is such that I can foresee,—or think I can,—such legislative enactments as might hamper the trade and cause much inconvenience and discomfort to the public, if they are not provided for beforehand.

I observe with considerable satisfaction that, with regard to the abstract question of the claims of anthracite as a smokeless and useful fuel for domestic consumption, your views, Sir, appear to accord with my own. This is no small matter, for, so far as my experience goes, I find a strange lack of knowledge of even the component parts of the mineral. Moreover, if I may put it in this way, you have pointed out the actual secret of successful burning by indicating the necessity of breaking anthracite into small pieces. Will you allow me to add that this very requirement will be a guarantee that only *pure* anthracite will reach the domestic market? If the public in future decline to buy any but broken anthracite the exploitation of rubbish would meet with the necessary check. It would hardly pay mine proprietors and future sinkers in South Wales to erect the necessary machinery to break inferior stuff, which would sooner or later be left on their hands. Then the London dealer would have his connexion to consider.

Coming to the important question of supply,—and its correlative, that of price,—I have not suggested that anthracite should be used for all purposes. This, therefore, narrows my reply to its domestic use. Again,—as it is necessary in all reforms to begin somewhere,—it is in the metropolis that the londest complaints have been made of the combined fog and smoke nuisance, and where possibly the first effort to abate it will be made. Now, how do our anthracite supplies stand with regard to London, which appears to me to be the first, the natural, market? You very truly observe that there is a good deal of guess-work about geology. As a matter of fact, the anthracite output of South Wales has increased of late years to a very remarkable degree. There is an obvious difficulty in tracing the tonnages in our own mineral statistics, but I am endeavouring to collect a few well-authenticated figures. But nearly all this output has gone abroad, *including some parts of America and Canada*,—why should we not have it in London? Depend upon it, there is a very large body of anthracite in the three Welsh counties where it has been traced. So far, entirely through want of knowledge, no encouragement has been given to the business at home. Sooner or later there will be a change, and it is not at all improbable that the recent,—very recent,—history of Welsh coal-mining, which has caused Cardiff to eclipse Newcastle, will in part be repeated at the more western ports of Swansea, Llanelly, &c. In any event, the question of price will settle itself. If anthracite should reach a prohibitive figure, I for one should not attempt to sell it.

Your correspondent, "H. F. H." (p. 464, *ante*), will, I think, find sufficient answer in your own article, especially in the American figures quoted. As to Mr. R. F. Barnes' objections (1) a good deal might be said on the use of anthracite in manufacture; (2) every *well-made* grate has a good draught, or one can be secured by simple and inexpensive means; (3) tests have proved that a stronger heat is thrown into a room from anthracite than from any other high-class coal, both tried in the same modern grate with vertical bars.

R. S. RICHARDS ("R. S. R."),
London Manager of the Gwaun-cae-Gurwen Colliery Company.

"BENNETT'S" HYDRAULIC SELF-CLEANSING STREET GULLY.

SIR,—In your last week's issue you publish a description, accompanied with a woodcut, of what is said to be an invention by Mr. W. B. G. Bennett, C.E., Southampton, and termed an hydraulic self-cleansing street gully. Without troubling to make the usual researches at the Patent Library, or making any inquiries, he is said to be making and fixing them for the Corporation at Southampton.

To do justice to your readers you will, by kindly inserting this letter, let the public know this invention was made and patented by me in 1884 both in England, France, and Germany, and fully illustrated and described by you in your paper issued July 2, 1887, with recent improvements introduced.

I need scarcely say the apparatus was exhibited by me in action to many thousands of people at the late Inventions Exhibition in 1885.

Corporations from many parts of the country were disposed to give it a fair trial, but at present remains in abeyance. I hope very shortly to put some down for trial, when it will be seen in operation in London and elsewhere.

W. B. POWELL.

*** We have referred to the description and diagram of Mr. Powell's machine, under the date given, and find that the main principle is certainly the same as in Mr. Bennett's machine, though there are some differences in the details.

The Student's Column.

CONCRETE.—XXVI.

WALLS.

THE use of concrete for walls has not extended as rapidly as was anticipated by men who wrote and spoke about the material twenty or thirty years ago. Several causes have combined to hinder architects from adopting it. Prominent among these are the dangers arising from its manufacture by careless workmen and unscrupulous contractors, the difficulty and expense of moulding it to curved or irregular forms, and the bald appearance and unlovely colour of the material itself. The erection of a concrete building is an event requiring a fresh study of nearly every detail. The insertion of brick or stone quoins and window dressings, or of projecting features of any kind, is fraught with difficulty. The points of attachment for joinery, &c., must be considered before the walls are begun; and in a hundred ways thought must be exercised or the building may prove more or less a failure. Other objections to concrete walls are their homogeneity and hardness, which render the hanging of pictures and the fixing of plugs difficult tasks, and which make alterations a costly affair (this last is raised as an objection sometimes, but may perhaps be regarded as an advantage); the ease with which sound is transmitted through concrete walls is certainly a point against them; but it may be said, on the contrary, that good concrete is considerably less pervious than brickwork and some kinds of stone, stronger and more durable, and, under certain circumstances, much cheaper. The matter of cost, however, is one which cannot be settled off-hand; so much depends upon the distance which brick or stone, or, on the other hand, the concrete-materials, may have to be brought, and upon the price of these materials; upon the cost of skilled and unskilled labour; upon the simplicity or complication of the plan of the proposed building, and the detail of its elevations; and so on. At one time, it was customary to talk volubly of the great economy of concrete over brickwork or stonework, but over and over again contractors have shown by their tenders that they thought quite otherwise. Engineers certainly find it economical to employ concrete for marine-walls, breakwaters, dock-walls, and the like, but these are vastly different from the walls of buildings; the concrete is in large masses, and requires, in comparison with its bulk, very little framework, whereas in buildings the walls are thin, and the cost of the framework (including labour in fixing and removing), especially if the plan is irregular, amounts to a considerable sum per cubic yard. Again, on the sea-beach, engineers are provided with suitable sand and gravel or shingle, for the merely nominal cost of getting it; sometimes the aggregate required in buildings must be brought from a distance, and must be broken and washed before it is fit for use. Engineers, too, make use of a concrete in the backing of retaining-walls, and in the hearts of dock-walls, &c., much inferior in quality to that which is required in the walls of buildings; in those positions, 1-to-10 and 1-to-12 mixtures are far from uncommon.

In our first chapter we pointed out that from the time of the Romans to the present day concrete-walls had been erected, and that many of these were still standing. There can be no question of the durability of good concrete-walls. At Middleham Castle masses of concrete lie amid the ruins, while one large mass remains poised on a slender pier of the same material. At Guildford Castle, which was erected in the latter half of the twelfth century, are concrete-walls from 11 ft. to 14 ft. in thickness at the base, the aggregate consisting largely of flints.

Apparently the first attempt in this century to use concrete on a large scale was made about 1835 by Ranger, who built a graving dock and sea-wall at Woolwich; the concrete consisted of grey-stone, or of hydraulic lime and gravel, mixed with hot water. Mr. Bernays said in 1880 that the sea-wall was "a few years ago in remarkably good condition." Cottages of Roman cement concrete were built at Harwich in 1841, and Bridgewater in 1846, of Medina cement concrete near Osborne (Isle of Wight) in 1852, and of Portland cement concrete in the Isle of Thanet in the same year. The last were, according to Mr. Drake, perfectly sound and free from damp in 1872. In 1865 Mr. Tall patented a concrete-building apparatus or framework. In 1868 Mr. Drake patented his iron apparatus, and in the following six years "thousands" of buildings, including mansions, houses, churches, chapels, warehouses, mills, &c., were built by means of it. Besides these, many other patents have been taken out for such appliances, among which we may name those of Osborne, Lish, Potter, Henley, and Broughton. We fear that many of them have been more ingenious than useful, and have proved of little benefit to their inventors.

The principal parts of all building-frames for concrete walls are the "standards" and the "shutters" or movable panels. The standards are usually of wood, sometimes of iron, and are of any convenient length. We do not think it necessary to enter into the details of the different patented apparatus; it will be sufficient for us to explain the common system, which, after all, will usually prove best and most economical. See figs. 12 and 13. Standards, SS, are bolted together in pairs, the space between them being the thickness of the intended wall. These are then set perpendicular at distances of from 6 ft. to 12 ft., according to the length of the wall. The standards at the angles of the building must be bolted together diagonally. All the pairs of standards are kept in position by means of stays nailed to stakes in the ground, or in some other manner, and also by means of pieces of wood, such as slater's laths, nailed from pair to pair, on each side of the wall. Great care should be taken that the standards are perfectly perpendicular and in line, as on them the straightness of the future wall depends.

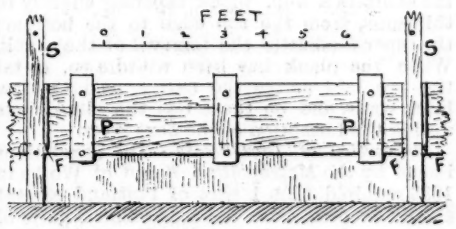


Fig. 12.

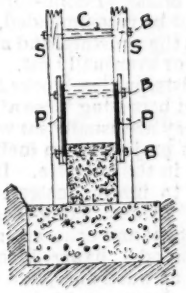


Fig 13.

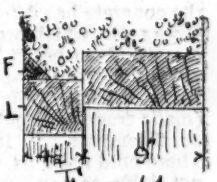


Fig. 14.

Sometimes the standards are omitted altogether, and the walls formed by means of panels only, but this is a practice not to be commended, as it enhances the difficulty of constructing the walls quite straight and vertical.

The "shutters" or movable panels, PP, are usually made of 1 in. or 1¼ in. boards nailed to ledges along the back, and smoothly planed on the face. Sometimes thin sheet-iron is nailed on the face of the boards to protect them from the wet concrete, but this is scarcely necessary, as it increases the cost without corresponding benefit, and renders the panels more difficult to shorten or alter in any way. To prevent the adhesion of the concrete, the faces of the panels are frequently covered with a coat of oil or soft soap.

The panels are, like the standards, bolted together in pairs by means of wrought-iron bolts, BB, passing through turned hardwood cores or distance-pieces, CC, which regulate the thickness of the wall; these cores are made to taper slightly, in order that they may be the more easily driven out when the concrete has set.

The width of the panels is usually such as to allow a layer 18 in. deep to be deposited at one operation.

When the standards are all in position, the panels are laid between them, and secured by means of fillets, FF, nailed to the standards. Panels should be provided sufficient to enclose the whole length of walling intended to be formed in one day, as otherwise the concrete will be strained by the removal of the panels in less than twenty-four hours. When some of the panels have been fixed in position, the concrete may be mixed, deposited within the frames to the full depth, and rammed, and so on, until the day's allotted task is complete. When the circuit of the building has been made, work is recommenced at the same pair of panels as on the first day. These are removed by withdrawing the bolts; their faces are scraped clean of all cement, &c., and the panels are refixed on a higher level, the lower row of bolts in the panels now passing through the cores of the higher row in the previous layer. As the work proceeds, other panels are taken down and refixed until the second layer is complete. No panel ought to be removed in less than twenty-four hours, for Portland cement concrete. The holes left after the cores are withdrawn must be completely filled with cement mortar (1 to 2).

The openings of windows and doors, including the necessary reveals, must be formed with rough wood-framing, which must be kept from bulging inwards by suitable struts. The temporary lintels must be supported on props, the props resting on wedges by which their removal is facilitated. The head of the openings may be chamfered by means of a triangular fillet, nailed to the outer lintel, L (Fig. 14). Permanent lintels, either of wood, iron, or stone, or brick or stone arches, are unnecessary, but Mr. Potter recommends the insertion of wrought-iron bars (caulked at each end), a few inches over all openings, as these "help to prevent the unsightly cracks which sometimes occur in concrete walls."

The insertion of wood bricks or bond-timber into concrete walls cannot be recommended, as they are sure to swell with the moisture, and may afterwards become loose, or eventually rot. To prevent the ends of wood joists, purlins, blocks, &c., where such are used, from becoming loose after the concrete has dried, they are usually set with large nails, which are left projecting an inch or more, and so get a hold in the concrete. It is always better, however, to insert, instead of wood bricks, Wright's patent fixing-blocks (made from Portland cement and coke-breeze), or Thompson's "Brickwood" fixing-blocks. These hold nails as well as wood does, and are not liable to swelling or decay, or to damage by fire. Joists and purlins of wood can usually be superseded by rolled iron or steel, while for the floors of rooms up to 14 or 15 ft. square, joists may be dispensed with altogether, and solid concrete floors laid instead. Where, for the sake of economy or any other reason, ordinary joisted and boarded floors are required, the ends of the joists can be built into earthenware or stoneware joist-boxes, which are embedded in the concrete. Or soft bricks can be built into the concrete where required to receive the joists, and when the concrete has set and the panels have been removed, the bricks can be cut out and the joists inserted. In many cases the upper walls are thinner than those below, and the joists can rest on the ledges thus formed. When solid concrete floors are desired, they should be laid right over all walls when these are at the proper height, and not left to be added after the walls are finished.

Flues.—Flues for smoke and ventilation may be formed by wooden cores, which are made collapsible in order that they may be easily withdrawn. But it is always far better to form the smoke-flues by means of earthenware or stoneware pipes; these may be ordinary circular drain-pipes, socketed or unsocketed, or may be special flue-pipes of circular, elliptical, or oblong form, the oblong form having rounded corners. Combined smoke-and-air flues of various sections can be obtained from several makers, and these are well adapted for building into concrete chimney-breasts.

Pipes.—Pipes for water, gas, waste-water, &c., should never be built into concrete walls, on account of the difficulty of repairing them in case of leakage. Chases can easily be formed in walls where required to receive such pipes, and the front of these can be finished afterwards with wood casing.

Absorbence and Porosity.—Good concrete is much less absorbent than ordinary bricks, while in brickwork there is the further disadvantage that the joints (if of lime-mortar) are easily penetrated by water. Bad concrete, however, cracks and admits driving rain easily. In 1876 Mr. Alexander Payne, A.R.I.B.A., read a paper on "Concrete as a Building Material" before the R.I.B.A., and Mr. Payne summed up the discussion which followed by saying, "Some five speakers have averred that concrete is wet, condenses water, shrinks, cracks, and contracts, while ten declare that it does not condense water, does not shrink, nor crack, nor take up damp." Mr. Payne wrote to a number of persons who had had a large experience in concrete building, and their testimony was to the effect (1) that concrete houses are warmer and drier than brick or stone ones, and can be sooner occupied; (2) that concrete does condense moisture (so also do brick and stone), but that plaster rendering inside overcomes the objection; and (3) that concrete made with good air-slaked Portland cement does not shrink.*

An instance of concrete building was given by Colonel Lumsden in the same discussion. The walls of certain additions to his own house, an old Aberdeenshire Castle, were built of concrete, 15 in. thick up to the first floor, and 12 in. above; at one corner a hanging turret about 6 ft. in diameter, was constructed with walls 9 in. thick, the supports under it being removed at the end of a week. The concrete was composed of one part Portland cement and six parts gravel, varying in size from a pea to a hen's egg, and was afterwards skimmed outside with a coat of cement-mortar, $\frac{1}{8}$ in. thick (3 cement to 5 sand).

Hollow concrete walls have frequently been built in order that the internal face of the walls may be perfectly dry, and of more uniform temperature. With good concrete in ordinary situations, and for ordinary buildings, the precaution is unnecessary, but where hollow walls are considered advisable, they may be formed by inserting in the required position between the shutters a 3-in. plank tapering slightly in thickness, from the top edge to the bottom; the taper facilitates the removal of the plank. When the plank has been withdrawn, metal ties are laid across the cavity, as in hollow brick walls, and on these ties the plank rests during the formation of the next layer.

Proportion of Ingredients.—The regulations issued by the Metropolitan Board of Works in 1886 required that 1 part of Portland cement should be used with not more than 8 parts of aggregate (containing sand). It was not stipulated that the sand should be measured separately. This precaution ought, however, to be adopted, and the concrete might be specified to be composed of 1 part Portland cement, 2 parts sand, and from 4 to 6 parts screened gravel, broken stone, or other material. The aggregate for walls should be strong, dense, and durable.

Thickness of Walls.—There is no doubt that good concrete walls are stronger than good brick walls; but such is the danger of concrete being scamped, that the regulations of the Metropolitan Board of Works (mentioned above) require the thickness of concrete walls "to be equal, at the least, to the thicknesses for brickwork prescribed in the Building Act."

OBITUARY.

Mr. Lyons Wright.—The death is announced of Mr. Lyons Wright, Consulting Engineer to the Waterworks Committee of the Wolverhampton Corporation, which took place on the 13th inst., at his residence, Worcester-street, Wolverhampton, after a long illness. Mr. Wright was a native of Hull, and was afterwards engaged at Manchester. About thirty years ago he left the latter town and came to Wolverhampton as Engineer to the Waterworks Company, and when the waterworks were transferred to the Corporation he entered their employ, and continued to hold his office for twenty-four years, until the Council meeting in June this year, when he was appointed Consulting Engineer, and Mr. E. A. B. Woodward, of St. Helens, succeeded him as Engineer of the waterworks. He was in his seventieth year.

Clerkenwell-road.—A site has been cleared between Holborn Town-hall and "The Griffin" public-house, on the south side of Clerkenwell-road, for the building, now in progress, of the offices and hall of the Workmen's Club and Institute Union, Limited. We are informed that the plans and designs are by Mr. Wm. D. Caröe.

* Apparently contraction during setting and hardening is here referred to; this must not be confounded with the contraction and expansion due to changes of temperature.

GENERAL BUILDING NEWS.

New Technical School, Aston, Birmingham.—The foundation-stone of the new Technical School for the Manor of Aston, to be erected at the junction of the Whitehead and Ettington roads, was laid on the 8th inst. by Mr. R. P. Yates, Chairman of the Technical School Committee. The new buildings will have a frontage to Whitehead-road of 98 ft., and to the Ettington-road of 90 ft. They will consist of three stories, the lower story being a semi-basement. The principal entrance will be at the corner. The middle floor will be approached directly from the entrance by a short flight of steps, 12 ft. wide, divided by a central handrail, and directly opposite at the rear will be a large staircase, leading to the floors above and below, from which the corridors to the right and left give access to all the various rooms. The accommodation of the basement or lower floor will comprise a modelling room, with recess for casting; engineering class-room, with engine-house and electric-lighting appliances adjoining; metallurgical class-room, with fire-proof bench; plumbing workshop; a laundry, having washhouse, drying-closet, and ironing-room, and there will be also a spare class-room, heating-vault, stores, &c. The middle or ground-floor will have a large lecture-room, two large rooms for elementary art, secretary's and curator's rooms, teachers' rooms, stores, and four class-rooms for sundry subjects. On the upper floor will be a chemical laboratory for 40 students, with preparation-room, balance-room, teachers' room, and stores adjoining; a large lecture-room, and also art class-rooms. On each floor ample lavatory and cloak-room accommodation will be provided. At the rear of the premises a separate one-story building is to be provided for teaching carpentry and joinery work, accommodating 60 students. The buildings will be warmed by low-pressure hot-water pipes, and electric light will be provided throughout. The ventilation of the whole rooms, corridors, &c., is to be automatic. The elevations are to be faced with best pressed bricks of Stourbridge manufacture, relieved with stone and terra-cotta. The amount of the contract is 5,545*l.* The contractor is Mr. F. A. Stephens, Aston, and the architect Mr. George H. Cox, of Birmingham.

Electric Light Station, Arundel.—We understand that the tender of Messrs. Reed, Blight, & Co., Limited, London, has been accepted for an electric light station at Arundel. for the Duke of Norfolk. Mr. A. F. Phillips, of Great George-street, Westminster, is the engineer.

Alterations to Southminster Parish Church.—According to the *Essex County Chronicle*, after undergoing extensive alterations, the parish church of Southminster has just been re-opened by the Bishop of St. Alban's. The transepts have been screened off for a vestry and an organ chamber on the north side, and for a chapel for occasional use on the south side. A choir has been formed in front of the chancel, and is inclosed by a screen of oak, the choir stalls being of the same material. The chancel has been raised, two new windows have been inserted in the north and south sides of the apse, and a reredos of stone, and an arcading around the sides of the chancel, have been erected. The organ has been removed to the north side of the transept, occupying about one half of the space at the east end. The other works include a new altar table, a new pulpit, the re-seating of the nave with pitch-pine benches, and the provision of new oak doors at all the entrances. Two old windows were discovered in the porch, and these have been restored, and filled with cathedral glass. By the removal of the gallery and the opening out of the tower arch, the echo, which formerly interfered, it is said, with the hearing, has been got rid of. Hot water apparatus has been introduced for heating purposes. The whole of the work has been done from the designs and under the personal superintendence of the vicar, the Rev. W. H. Lowder. The general work has been carried out by Mr. Tom Stammers, builder, of Southminster; the stone work has been done by Messrs. Day & Hazelgrove, of Bishops Horton; the screens and chancel fittings have been made by Messrs. Luscombe, of Exeter. The whole cost of the work amounts to about 2,000*l.*

Catholic Church, Milltown, County Kerry.—The Catholic church at Milltown, near Killorglin, has, says the *Cork Examiner*, for some years been in a dangerous state, with the roof supported by props from the floor. A new church has, however, just been commenced. The church will consist of nave, transept, chancel, nuns' choir, and sacristy, with bell turret and spire rising to the height of 75 ft.; it is in the style of the thirteenth century, of a simple type, with walls of rubble work, and dressings of Ballybeggan limestone from the quarries of the contractor, Mr. John B. Healy, of Tralee. The designs were prepared by Mr. Daniel O'Connell, Derrynane Abbey. The total cost of the church is expected to be about 4,000*l.*

Parish Institute, West Green, Tottenham.—The new Parish Institute in connexion with Christ Church, West Green, was opened by H.R.H. Princess Christian on the 7th inst. The building, which is built at the north-east

corner of the site upon which the Church stands, is of simple oblong form, and is designed by request to be somewhat in keeping with the Church. The main entrance leads into a lobby, with cloak-room, lavatory, &c. A double-glazed door divides this lobby from the large ground-floor parish-room or hall, 80 ft. by 34 ft. A raised platform with ladies' and gentlemen's dressing-rooms on either side is placed at the south-end of the hall. Two double-door exits are placed in the west and east sides of the room, all doors being made to open outward. A door at the back of the platform gives direct communication with the caretaker's house, and also forms a convenient private entrance for performers, besides allowing for the possible use of the rooms in the caretaker's house. In the front of the platform are sliding doors, so that the space under can be used for scenery or other theatrical effects. The hall ceiling is entirely match-boarded for acoustic reasons. The brick walls are colour-washed with a warm cream colour, the red brick dressings in the jambs and arches and the stone sills to the windows being kept their natural colour. The room is lighted by hanging pendants, and will accommodate from 800 to 900 persons. The architect is Mr. Geo. H. Fellowes Prynne, of Westminster, and the contractor Mr. Percival Hart, of West Green. Mr. S. Wood has acted as clerk of works.

PARISH CHURCH, RENTON, DUMBARTON.—The new parish church of Renton, which has been in course of construction during the past fifteen months, was opened on the 18th inst. The new church is situated in Leven-street, at the south end of the village, and is of red sandstone. The design is, says the *Glasgow Herald*, seventeenth-century Gothic. The building has a nave and transepts and chancel for choir, with side organ-chamber. There is a tower of three stages in the centre of the front gable of the nave. This tower forms the entrance wall, and provides in the upper stage the belfry, in which is placed a new peal of bells. The length of the building over all is 124 ft., the width across the transepts being 100 ft. It provides sitting accommodation for 800. The roof is open to the top. The pulpit is placed at the south side of the chancel arch, and the baptismal font at the north side. The building is heated by hot-water pipes, running along the floor at each side. The architects were Messrs. H. & D. Barclay, Glasgow; the builder, Mr. James Barlas; joiner, Mr. John Gillis, both of Alexandria; heating, Messrs. Boyd & Son, Paisley; and painter, Mr. W. Menzies, Bonhill.

BLACKPOOL TOWER.—Messrs. Maxwell & Tuke, the architects of the Blackpool Tower, report satisfactory progress with its erection. The tower is now completed up to 55 ft. high.

MODEL LODGING-HOUSE AT VAUXHALL.—On the 15th inst., a large model lodging-house, which has been erected by Lord Rowton at Bond-street, Vauxhall, for the accommodation of working-men, was opened for the inspection of visitors. The building, which has been named "Rowton-house," is situated in a somewhat narrow thoroughfare named Bond-street, near Vauxhall Cross. Having a frontage of 150 ft., the building runs back to the South-Western Railway, a depth of 105 ft., there being a paved promenade 23 ft. in width between the house and the railway. Red brick and stone are freely employed in the outer walls, while internally much use is made of glazed brick and tile. The floors throughout are of concrete, with steel joists, and the various sections of the building can be easily shut off from each other. Provision has been made for 470 beds, nearly all in separate cubicles, each provided with a window under the control of the lodger. The dormitories are arranged on four floors above the ground floor, and two officials will sleep on each floor. All the floors are heated by hot water, and there is ample provision of fire-mains and hose-pipes. The sanitary appliances have been carefully planned and executed. Upon the ground-floor is the Superintendent's office and private rooms, a barber's room, dining-rooms and kitchen, a caterer's bar, lockers, and a smoking and reading room. Upon the first-floor is a reading and writing room, 70 ft. by 18 ft. The dining-rooms are fitted with ranges for men to cook their own food, while at the window opening into the caterer's-room those who prefer to purchase their food already cooked can do so. The building has been erected from designs by Messrs. Beeston & Burmester.

STAINED GLASS AND DECORATION.

WINDOW, SANDY (BEDS.).—A memorial window has just been fixed in the parish church in memory of Mrs. Peel, the late wife of the Speaker of the House of Commons. It consists of a four-light window with tracery above, illustrating the subject of Faith, Hope, and Charity. For the latter subject the two centre lights are treated as one design, in which the central figure is that of Christ with hands outstretched to welcome those who come to him: the composition being completed by kneeling figures of a prisoner and a penitent, with the inscription extending through both lights, "Come unto me all ye that are weary and heavy-laden, and I will refresh you." The side lights, illustrating Faith and Hope, are treated independently as far as the figures are concerned, but partially connected with the central design by the employment of canopies and vases of similar design to the centre, though in different colours. The work was designed by Mr. H. G. Murray for Messrs. Belham & Co., of London, who executed the window.

MEMORIAL WINDOW, PARISH CHURCH, ROSTHERNE, CHESHIRE.—A new memorial stained-glass window has just been fixed in the recently-restored parish church of Rostherne, Cheshire. The window is situated on the north side of the church, and consists of ten lights filled with ten subjects,—viz., examples of faith, taken from eleventh chapter of Hebrews. The work has been carried out by Messrs. Heaton, Butler, & Bayne, of London.

WINDOW, ELLAND WESLEYAN CHAPEL.—The large window facing the pulpit in the new Wesleyan Chapel, Elland, has just been filled with stained-glass to illustrate the verse in St. Mark's Gospel: "Daughter, thy faith hath made thee whole; go in peace." The window is in the Italian Renaissance style of work, and has been executed by Messrs. Powell Bros., of Leeds.

FOREIGN AND COLONIAL.

FRANCE.—The sculptor Ernest Barrias has been commissioned to execute the statue, got up by a Committee, to Anatole de la Forge, French politician, who has recently died. The monument is to be placed in Père-la-Chaise.——The National Society of Fine Arts, presided over by M. Puvis de Chavannes, has decided that for the future there shall be a Section of Architecture at the Champ de Mars Salon.——The Government has just had a number of models made of the best specimens of French architecture from the eleventh to the nineteenth centuries, for the Chicago Exhibition. This collection, which will cost about 115,000 francs, not including cost of transport, will be the property of America, and will form the nucleus of a magnificent museum of casts.——It is announced that M. Larroumet, late Director of Fine Arts, has applied for the post of Director of the Gobelins manufactory in place of M. Gerspach, who has resigned. ——M. Ernest Babelon is appointed Keeper of the Department of Medals and Antiquities at the Bibliothèque Nationale, in place of the late M. H. Lavoix.——M. Molinier is elected assistant keeper of the Louvre Museum.——M. M. Maindron is being sent by the Government on an ethnographical mission to the districts near the Red Sea and Persian Gulf.——The architect, M. Edouard Mariette, brother of the celebrated archæologist Mariette Bey, has just offered to the Louvre Museum a curious crayon portrait of Eugène Delacroix, executed in 1840 by Deveria.——An inhabitant of Sautenay has just found at the bottom of a well a bronze vase, of very beautiful workmanship, with chased handles representing Roman eagles. He has also found some coins and spurs of the same pattern as now used by the Arabs, and which probably date from the time of the Saracens. These objects have been placed in the Museum at St. Germain.——The Municipal Council of Grenoble have decided to place a marble slab on the house where M. Alphand was born.——The Municipal Council of Havre have decided that the statues of Casimir Delavigne and Bernardin de St. Pierre shall be erected on the Place Gambetta.——The "Société Artistique de l'Ouest" is preparing a large exhibition of local art, which will be opened at Mans (Sarthe) on June 1, 1893. At the same time the monument erected to the memory of Germain Pilon in this town will be inaugurated.——The "Union Patriotique du Rhône" will open a competition amongst Lyons artists, which will have for its aim allegorical or symbolical works relating to scenes in the history of France.——M. Pierre Devaux, a sculptor, and MM. C. Jung, Lambert, and Louis Piot have just opened an interesting exhibition of their works in the foyer of the Théâtre Bellecœur at Lyons.——The death is announced, at the age of forty, of the painter, Georges Brétegner. He had acquired an honourable place in painting historical and war subjects.——M. Robert Robmann, a Russian landscape painter residing in Paris, has just died in this city at the age of forty-seven. He exhibited at the Champ de Mars Salon landscapes of the environs of Paris, and views in Normandy. He received the decoration of the Legion of Honour at the Universal Exhibition of 1889, when he was made vice-president of the Russian section.——We have also to notice the death of M. George Hachette, one of the chiefs of the well-known library in the Boulevard St. Germain.——The Société Centrale des Architectes has elected its officers for 1893, as follows:—President, M. H. Daumet; vice-presidents, MM. J. Guadet and Achille Hermant; chief secretary, M. F. Roux; assistant secretary, M. Boileau; editing secretary, M. Poupinel; archivist, M. Ch. Bartaumieux; treasurer, M. David de Penanrun; censeurs, MM. Paul Sédille, Alfred Normand, and Lucien Étienne.

SWEDEN.—In the fashionable villa quarter Djursholm, a suburb of Stockholm, building sites to the value of 300,000 kr. have now been sold. The suburb will be connected with the city by an electric railway.——The designs for the rebuilding of the Church of Jacob in Stockholm have been passed by the authorities, and the work will shortly be commenced.——The interior of the Catholic Church of St. Erik has now been nearly completed. The fittings, of carved woodwork, have been produced at Münster.——A new building syndicate has been formed in Stockholm, with a capital of one million kronor, with a view to erect numerous dwellings on certain lands in the southern part of the town.——Work on the new Stockholm Opera-house is progressing. The grand terrace in front will face the Square of Charles XII. on the left-hand side, and will be composed of two main stories, viz., a bottom one below the level of the site and a first floor, partly *entresol*. Above the building itself will be the open terrace, 1,100 square mètres in area, and laid with cement. In the basement the steam machinery will be placed in a chamber isolated by walls, floor, and ceiling of concrete. The architect is Herr Hillerström, of Stockholm.——King Oscar has just unveiled two more frescoes on the grand staircase of the Royal Palace, painted by Prof. Julius Kronberg. They represent "Aurora" and the "Four Elements."

NORWAY.—The work on the new State theatre to be built in Christiania from the designs of Herr Bull, State architect, is progressing but slowly, owing to the scarcity of funds and indecision as to the exact plans to be adopted. The site has, however, been piled, and part of the concrete foundations laid, but the latter work must cease during the winter. The house is situated in the west end of the town, opposite the University, and near the Royal Palace.——The "Norwegian Labour Party" is carrying on an agitation for inducing the municipal authorities of Christiania to erect cheap and healthy dwellings for working men, of which there is great need in the capital. At present the state of things is said to be very bad; moreover, the Sanitary Board of the city does not appear to have powers to declare dwellings unfit for habitation.——Works for the supply of electricity are to be erected in the town of Malesund, on the north-west coast, the motive-power being furnished by a waterfall situated six miles from the town.——The competition for the erection of new premises for the Bank of Norway, in the City of Christiansand, has terminated in favour of Herr Berle, architect. There were sixteen competitors.——A subscription has been started for the building of an English church in Bergen, largely visited by English and American tourists. A sum of 200*l.* has been subscribed, and if 1,000*l.* can be raised, the civic authorities will grant a free site.

MISCELLANEOUS.

THE CERCLE DE LUXE, PICCADILLY.—It was stated in the daily press last January that Messrs. Cochrane & Sons had bought for 80,000*l.* the freehold of Hatchett's Hotel, with the White Horse Cellars, at the corner of Dover-street. On November 28, 1885, we published a view of the new buildings, together with a plan of the mezzanine and basement floors — as erected by Mr. John Grover, from the designs of Messrs. W. S. Weatherley & Jones. See also our columns of December 27, 1884, for a description of the premises, which on January 26, 1887, were sold at auction for 65,000*l.* We now hear that the hotel has been converted for purposes of the new Restaurant Club, known as the Cercle de Luxe, its interior having been decorated and refurnished by Messrs. James Shoolbred & Co.

APPOINTMENT OF BUILDING INSPECTORS.—At a meeting of the Hornsey Local Board, held on the 19th inst., the General Purposes Committee reported that they had received eighty-three applications for the post of Building Inspector. There were now two vacancies to be filled, therefore they had selected ten candidates, who were invited to attend at the Board's offices on the 17th inst., and submit themselves to an examination in order to test their competency to perform the duties of the office. The examination, which lasted five and a half hours, was of a searching character. The candidates were given questions to answer in writing, and subsequently their knowledge of building materials was put to a practical test. The numbers were then reduced to five, namely, Messrs. Comber, Horton, Parham, Phillips, and Sealy. These gentlemen were further interviewed, and reduced to three, namely, Messrs. Parham, Phillips, and Sealy, and ultimately the committee decided to recommend that Mr. John Parham, at present engaged as Sanitary Inspector at Hackney, and Mr. Henry Albert Sealy, now one of the temporary Inspectors in the Board's employ, be appointed, and the recommendation was confirmed by the Board. The salaries are 160*l.* per annum.

REMOVAL.—Messrs. Reed, Blight, & Co., Limited, contractors, notify that they have removed their head offices from Sutton Harbour, Plymouth, to Albany-buildings, 47, Victoria-street, Westminster, S.W. The depot and works remain at Plymouth.

THE BRUGES SEA PORT PROJECT.—The *Independance Belge* states that the technical financial sub-commission appointed to examine the various projects for converting the old town of Bruges into a seaport have now terminated their labours. This scheme is part of another for the construction of a canal admitting vessels of the deepest draught from the North Sea. The commissioners have

COMPETITION, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITION.

Nature of Work.	By whom Advertised.	Premium.	Designs to be delivered.
*Housing the Working Classes	Corp. of Plymouth	50l. 25l. & 15l.	No date

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Road Works (9 streets)	West Hartlepool Corp.	J. W. Brown	Dec. 27
Iron Fire Escape Staircases, &c.	Wakefield Union	Wm. Watson	do.
Iron Gasholder (Contract 774)	Hamburg Finance Deputation	*Official*	do.
*Sewerage Works	Wetherby U.R.S.A.	A. E. Preston	Dec. 28
School Building	Saltash School Board	H. J. Snell	do.
Six Shops and Houses, Marsden Huddersfield		J. Kirk & Sons	Dec. 29
Pipe Sewers, &c.	Jarrow U.S.A.	J. Petree	do.
Supply of Stone	Salford Corporation	*Official*	do.
Water Supply and Drainage Works, Fovant, Wilts	Wilton U.R.S.A.	do.	do
Flood Gates (large contract)	Haarlem Provincial Administration	do.	do.
Metal Sluice Gates, Sevan Bassin, St Malo	Ile et Vilaine Prefecture	do.	Dec. 30
Iron Castings, Steel Tyres, &c.	Prussian Royal Rails.	do.	do.
Block of Buildings, Murdoch's Wynd, Elgin, N.B.		A. & W. Reid	do.
Villa Residence, Dalrachney, Carr Bridge, N.B.	Jas. Gilbert		do.
Model Lodging House, Tredegar		W. R. Williams	do.
Police Station	Dundee Police Com.	W. Mackison	do.
Three Houses, Richmond-street, Weston-super-Mare	W. Gale	W. J. Spencer	Dec. 31
Institute ("Victoria")	Worcester Corp.	Simpson & Allen	do.
Waterworks (3,900 yards Cast-iron Pipes)	Invergordon Water Supply Commrs.	J. Fraser	do.
Market, &c.	Cardiff, &c. Hide, &c. Co. Lim.		do.
Lecture Hall and Class Rooms, Mountpottinger, Ireland	Presbyterian Church Committee	A. B. Hunter	do.
*Schools, near Neath	Coedfranc Local Board	T. C. Wakeling	Jan. 2
Additions, &c. Gasworks	Malvern Local Board	*Official*	do.
Road Metal (8,400 tons), Kerbing, &c.	Paddington Vestry	do.	do.
*Construction of Pipe Drain, &c.	Camberwell Vestry	do.	do.
*Wrought-iron Railings	Stockton-on-Tees Corp	do.	do.
*Making-up Roads	Islington Vestry	do.	do.
Sewerage Works (section 12)	Whitby Local Board	T. Keat Scott	do.
School Buildings, Girlington, Yorks		Milnes & France	do.
Roadmaking, Alexandra-road (sections 3 and 4)	Wimbledon Local Bd.	*Official*	Jan. 3
Paving, Kerbing, &c. Franklin-street, &c.	Eccles Corporation	A. C. Turley	do.
Dispensary, Marston-street	Oxford Muni. Charities		do.
School Buildings, Miskin, Mountain Ash (Glam.)	Llanwonno School Bd.	A. C. Evans	Jan. 4
Cast-iron Pipes (30 tons), &c.	Manchester Corp.	T. H. G. Berry	Jan. 5
Clay Retorts, Bricks, &c.	Rochester, Chatham, & Strood Gas Co.	W. Syms	do.
Refuse Destructor Buildings, &c.	Leicester Corp.	E. G. Mawbey	do.
Cast-iron Pipes, &c. (London)	Calcutta Corp.	J. Quick & Son	Jan. 6
School Buildings, Knowle	Bedminster (Bristol) School Board	M. Froud	do.
*New Stoneware Pipe Sewers	Hornsey Local Board	T. de Courcy Meade	do.

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Additions to Coachhouse and Stables, &c.	Met. Asylums Board	A. & C. Harston	Jan. 6
Water Pumping Works	Colchester Corp.	*Official*	do.
Road Works, Turmi-Magurele-Fort Railway		Roumanian State Rys.	Jan. 7
Public Baths and Washhouses	Port Glasgow T. C.	J. B. Stewart	do.
Mechanics' Institute and School, Ripon		Geo. Styan	do.
Iron Castings, &c.	Cardiff Corporation	J. Woolfsey	Jan. 9
*Making-up of Private Roads	Hornsey Local Board	T. de Courcy Meade	do.
*Constructing Sewers	Acton Local Board	*Official*	Jan. 10
*Cast-iron Water Mains	Hastings R.S.A.	Jeffrey & Skiller	Jan. 11
Sluice Gates, Dieppe	Seine Inferieure Prefecture	*Official*	Jan. 12
Bridgework, Approaches, &c. Newton-on-Ouse, Easingwold	Bulmer West District Highway Board	do.	Jan. 13
*Brick and Pipe Sewers, &c.	Smethwick Local Bd.	Harris & Harris	do.
Aqueduct (3 miles 11 chains), Loch Katrine	Glasgow Corporation	Mr. Gale	Jan. 14
Filter Beds, Service Tanks, &c. Maerdy	Pontypridd Waterworks Co.	T. Rees	do.
Water Service (2 contracts)	Lyons Municipality	*Official*	do.
Steel Rails (530 tons), &c. Meiningen	Werra Railway	do.	Jan. 16
Road Metal, &c.	Dorset County Council	do.	Jan. 18
Iron Bridge over Volterno	Terra-de-Lavoro Muni.	do.	Jan. 20
*Erection of Municipal Buildings	Corporation of Oxford	H. T. Hare	Feb. 7
Boundary Walls, &c. Armley, Leeds	Boro' Engineer's Dept.		No date
Work at Kirkstall Abbey, Leeds	do.	do.	do.
Re-building "Ship" Hotel, Stables, &c. Millgate, Wigan		Heaton & Ralph	do.
Club Premises, King-street, West	Wigan Reform Club	do.	do.
Sixteen Cottages, Wortley and Farnley Leeds		A. Webster	do.
Additions, &c. to Premises, Heathfield-street, Swansea	Mr. Griffiths	C. E. Hannaford	do.
Bungalow, Mumbles		do.	do.
Lodge, &c. West Cross, Swansea	Sir J. J. Jenkins	do.	do.
Heating Apparatus, Fitting, &c. Sligo	District Lunatic Asy.	Mr. Jones, C.E.	do.
Dwelling-house, &c. Blackpool	Williamson Bros.		do.
Additions, &c. to Inn, "Smith's Arms," Hafod, Wales		C. E. Hannaford	do.
Hotel, Stables, &c. Cwm, Ebbw Vale		Chas. Taylor	do.
Shed (120 ft. by 60 ft.) with Iron Roof	Penarth Cement Wks.		do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
Mining Surveyor	Government of British Guiana (Colonial Office)	1,920 dols. per annum	Dec. 28
*Clerk of Works	Manchester Corp.	4l. 4s.	Jan. 2
*Foreman Pavior	Rotherhithe Vestry	2l. 10s.	do.
*Assistant Surveyor, R. E. Civil Staff	Civil Service Com.		Jan. 4
*Surveyor	Condover Dist. H. B.	150l.	Jan. 6
*Inspecter for Sewerage Works	Leicester Corporation	2l. per week	Jan. 12
*Valuer and Surveyor, Ireland	Civil Service Com.		do.
*Surveyor	Ystradyfodwg Local Board	300l.	Jan. 13
*Head Mastership	Westminster School of Art		No date
Surveyors' Assistant	Sutton Coldfield (Borough Surveyor)		do.

Those marked with an Asterisk (*) are advertised in this Number. *Competition, p.* iv. *Contracts, pp.* iv., vi., *&* viii. *Public Appointments, p.* xviii. & xix.

decided in favour of the plans prepared by Messrs. Coiseau & Cousin, which would make Bruges the terminal port of the canal, somewhat similar to the position of Manchester on its ship canal. The full commission appointed to deal with the project has now the plans under consideration, but those referred to will be adopted in the main, and the works at Bruges commenced early next spring.

THE PROJECTED EXHIBITION IN ROME.—The project of holding an international exhibition in Rome in 1895, on the occasion of the celebration of the twenty-fifth anniversary of the city becoming the capital of Italy, has advanced another step by the election of Prince Ruspoli as syndic, who is an ardent advocate of the scheme. The native exhibits will embrace agriculture, industry, art, and science, and the foreign section also architecture and electricity.

RAILWAY MANUFACTURING WORK.—A long and very fully illustrated article on the Great Northern Railway Works at Doncaster appears in the *Engineer* of December 16. Those who wish to learn something of the processes of manufacture in a great railway workshop will find an unusual amount of information compressed into this article, which is, of course, of a very different calibre from the merely popular articles on railway work which have appeared in various magazines lately.

THE HIGHGATE MUSEUM OF SANITARY APPLIANCES.—We are asked to say that this museum, established by the Hornsey Local Board, is open free to the public daily from 10.30 a.m. to 8.30 p.m.

ROYAL STATISTICAL SOCIETY.—At a meeting of the Royal Statistical Society, held on Tuesday last, at the Museum of Practical Geology, the President, Mr. Charles Booth, in the chair, a paper was read by Mr. J. A. Baines (Census Commissioner for India) on the "Distribution and Movement of Population in India." As to the density of the population, the mean of which is 184 to the square mile, the provinces, which comprise 77 per cent. of the total number, show 230, and the states, 111. In Europe there is a population of about 38½ millions, of a density ranging from 500 to 600 to the mile, whilst in India over 46 millions live, in the proportion of 600 and over, and more than 36 millions show one and a half to the acre. But the density has to be considered with reference to the capabilities of the soil and the nature of the tract, and the above-mentioned remarkable congregation of people, owing to the great fertility of their tract and the variety of occupation to be obtained in it, are probably in better case than other tracts named, where the density is only 120 or 240. As regards town population, India presents a marked contrast to the western continents. Even including the smaller towns that have been given this status for municipal objects, only 10 per cent. of the population is classed as urban. In England 53 per cent. lives in places of 20,000 inhabitants or over; in India, only 4¾ per cent. The next subject taken up was the variation of the population since the last census. This amounts to 11 per cent., or 9¾ in the British provinces, and 15½ in Native States. In British provinces, the area supporting a population of less than the mean of 230 per mile, increased by over 13½ per cent., but the rest, by 10 per cent. only. Even in the most densely populated tracts, such as those mentioned above, the rate of increase was nearly 8 per cent.

THE EXHIBITIONS IN BRUSSELS AND ANTWERP.—The plans for the double exhibitions to be held next year in Brussels and Antwerp have now been approved by the Belgian Government, and may be considered assured. The necessary funds, too, have been secured through an arrangement between the Exhibition Committee and a banking syndicate. The Crédit Général de Belgique alone advances a sum of 1,500,000 f. upon the security of the takings for admission. There is besides subscribed a guarantee fund, amounting to 800,000 f., of which sum 250,000 f. are subscribed by the city of Brussels. A. M. Picard, an economist, proposes the formation of a special section, showing the unwholesomeness of workmen's dwellings in general and the dangers of certain classes of factories, works, and workshops.

WINDOW GLASS.—We have had brought under our notice some samples of the glass supplied by the Belgian Company known as the Red Star Glass Works. The glass is very clear and even in tint and texture, and appears altogether to be of excellent make. We are informed that the output of the company exceeds 12,000,000 square feet per annum, and new buildings are now in course of erection which will allow of the production being doubled by the addition of another large tank-furnace. These tank-furnaces measure 66 ft. by 17 ft. by 4 ft. deep, and contain a constant supply of 300 tons of molten glass, continuously drawn on, night and day, by a staff of 120 blowers.

THE FORTHCOMING EXHIBITIONS IN ANTWERP AND BRUSSELS.—The Belgian authorities have granted the use of the former exhibition buildings for the holding of the projected Exhibitions next year in Antwerp and Brussels, to which we recently referred. The Crédit Générale and the Société Générale have each granted 500,000 f. towards the guarantee fund, and the two cities a sum of 250,000 f. each. In the Brussels Exhibition will be represented the fine arts, historical art, salvage, and hygiene, but in Antwerp only commerce and industry.

THE ENGLISH IRON TRADE.—With the near approach of the Christmas holidays little alteration can be expected in the iron trade. Prices generally are unchanged. In crude iron little is doing, although a slight increase of activity is reported in the Cleveland pig-iron branch. Finished iron is very quiet, and tin-plates continue in a dull condition. Steel shows little change in most departments, inactivity being the rule. Ship-builders are a trifle busier; but engineers are poorly employed. The coal trade is moderate.—*Iron.*

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

,268.—BRICKS: *T. Sterratt, jun.*—This invention relates primarily to outside or facing bricks, and is designed to provide a brick well-locked in position in the wall, and which will render the joints between the bricks impervious to moisture. It consists of a brick formed with a V tongue on one side and end, or on two sides, and a corresponding V groove on the opposite side and end, or two opposite sides.

22,389.—WATERSPOUTS: *W. B. Shorland.*—This invention applies to the wire guards used for protecting the upper ends of waterspouts, nozzles, and the like, from the entrance of rubbish likely to choke them. It consists in improvements in their construction, tending to lessen their cost. The wires are placed, when cut and shaped, into suitable holders, and united together at the points of juncture by means of bosses, or rings, of easily fluxed metal, or other suitable material, which is run into the holders in a molten, fluid, or soft condition, soldering them firmly together when hardened; or the bosses or other joinings may be formed in two or more parts, and riveted, screwed, finished, or otherwise fastened together.

22,548.—WOODEN FLOORINGS: *F. Theissing.*—This specification refers to an invention intended to obviate the drawbacks in the construction of wooden floorings in new buildings, which are liable to rapid decay owing to the dampness of the building, and this particularly in the case of hard woods. Hard woods are for this reason frequently laid in a bed of asphalt placed upon cement. The deleterious action of the moisture has not, however, been avoided, as, owing to the damp penetrating, the flooring boards expand, and are thus lifted out of the support. Wooden floorings are by this invention so constructed that they cannot as such expand, but, on the contrary, the expansion of the several parts of which the flooring is composed is equalised in the flooring itself. The flooring consists of two layers of boards of hard wood, placed diagonally one above the other, which are combined into one by means of a composition, preferably asphalt, serving as connecting material in such a way that the mixture fills up the joints occurring between the two sets of boards where the individual boards meet one another. The lower surfaces, which are to be set in the mortar, as well as the four side surfaces, are covered with a water-tight coating, so that damp can only penetrate and again evaporate from above. Projections are provided on the lower side of the flooring boards to give them a suitable hold on the mortar. Any sideways displacement of the boards among each other is prevented by the lower boards being connected with the upper ones by means of nails.

22,562.—BRICK-KILNS: *W. W. Horn.*—The object of this inventson is to cause the heated gases to pass through any desired part of the kiln, and also to uniformly burn all the bricks in the kiln. The method of carrying these objects out can only be understood by a reference to the drawings and specification.

2,011.—WAINSCOTING: *K. Dieterich.*—This specification describes an improvement in the attachment of tiles to vertical walls in wainscoting the same, for the purpose of securely fastening the tiles in position, and for allowing their removal when necessary for repairs or otherwise. The tiles employed are of any desired size or ornamental character, and in all instances they are to be grooved upon two of their edges, so as to fit upon and be held by T-shaped metal bars. These bars are connected together by tie-rods passing through them and provided with nuts, so as to draw the bars towards each other, and firmly hold the tiles between them. In order to secure the said bars to the brickwork or studding of the wall, they are slotted in the body portions in suitable positions for the reception of slotted cross-bars, and through the slots in the cross-bars attaching bolts or screws or other suitable devices are passed.

16,803.—WATER-CLOSET SEATS: *E. L. Prins.*—This patent refers to a safety-seat, or cover for closet-seats, the object of which is to protect the public, and especially the travelling public, against contagion. The apparatus is composed of two half-cylinders, which when placed together form a cylinder connected at its upper side or end with a flange, which is more or less nearly round. The flange is also made in two pieces, joined together truly by two hinges, and these two pieces when out of use may be placed one against the other. This safety-seat is preferably made of aluminium, though other suitable materials may be employed. The said flanges and half-cylinders are capable of being folded together for transport, and are then placed in a specially-constructed bag or carrier, provided with spaces or recesses in the end portions of the mouth-frame adjacent to the hinges, to receive the extended or projecting ends of the hinges of the safety-seat.

NEW APPLICATIONS FOR LETTERS PATENT.

December 5.—22,204, J. Inwood, Ventilation of Windows without draught.—22,226, F. Bawson and T. Rhodes, Valveless Syphon for Draining Cisterns, Tanks, &c.—22,257, C. Brendenberg, Paint Brushes, &c.—22,275, W. Youlten, Sliding Windows.

December 6.—22,303, B. Atkinson and J. Kaye, Window-sash-fasteners.—22,310, J. Laing, Travelling Iron Roof.—22,331, W. Price, Screws for Joiners, &c.—22,389, T. Hall, Automatic Sash-fastener.—22,392, F. Sara, Flushing Cisterns.

December 7.—22,439, J. Thompson, Traps for Gullies, &c.—22,465, A. Boult, Malting Floors.—22,476, The Bostwick Gate and Shutter Co., Ltd., and W. Williamson, Lift Gates.

December 8.—22,488, J. Merrill, Lavatories and Wash Basins.—22,489, C. Berlè, Door-closer.—22,490, C. Gibbs and C. Couse, Heating Bakers' Ordinary Brick Ovens.—22,511, C. Burrows, Retaining Fastenings for Open Doors.—22,541, J. Spencer, Firegrates or Fireplaces.—22,574, J. Noel, Chimney or Ventilator Tops.—22,582, G. Capewell, Nail and Tack Driver and Puller.

December 9.—22,591, F. Sator, Wood Enamel Polish.—22,614, T. Brogan, Automatic Traps for Waste-pipes.—22,631, J Holland, Double Socket for Rain-water Pipes.—22,634, J. Hamblet, Machinery for the Manufacture of Bricks, Tiles, &c.—22,640, C. Doriot, Water-closets.—22,666, J. Morley, Connecting-ends of pipes.

December 10.—22,679, W. Copping, Construction of sash windows hung upon lines and pulleys and fittings for same.—22,687, T. Wimbush, Scaffold for Building, House Painting, &c.—22,690, J. Lord, Asphalt Waterproofing for Railway Bridges, Arches, Roofs, &c.—22,707, J. Craig and R. Highet, sen., Syphon Discharge Cisterns.—22,711, H. Gould and J. Bennett, Wood Screws, &c.—22,720, J. Challis, Damp-proof Boards for Constructive Work, Roofing, &c.—22,721, C. Darrah, Connecting Metal Pipes to Earthenware Closets.—22,734, S. Broadmeadow, Window-sash-fasteners.—22,738, D. Andrew, Sewer and other Pipes.—22,740, H. Ratcliffe, Sash-fasteners.—22,748, K. Thomann, Machine for Moulding and Pressing Tiles, &c.—22,754, A. Burton, Window-fastenings.

PROVISIONAL SPECIFICATIONS ACCEPTED.

19,283, P. Konig, Spring Catch or Fastener.—19,683, F. Poole, Squares.—20,166, W. Snelgrove and F. Wright, Levelling Instruments.—20,175, J. Hayward, Chimney and Ventilator Cowl.—20,181, L. Harris and W. Parkin, Dry Closets.—20 232 A. Allen, Traps for Water-closets.—20,264, H. Conolly, Water-closet Basins.—20,271, J. Lumley and T. Linskill, Weather-proof Reversible Sash Window.—20,381, J. Shanks, Water-closets and Water Supply Apparatus for the same.—20,442, E. Rassimer, Securing Doors.—20,609, W. Best, Brick Carrier.—20,623, W. and E. Freeman, Securing Window-sashes, applicable also to Doors.—20,760, J. Neate, Chimney-top or Cowl.—20,779, T. Utley, Combined Side-light or Scuttle and Ventilator.—20,781, T. Holman, Heating and Ventilating, more especially intended for use in creating currents for the ventilation of sewers.—20,866, R. Carey and R. Goudge, Ventilating Apparatus for Drains, &c.—20,930, J. Smith and J. Shuttleworth, Flushing Cisterns.—20,938, J. Shanks, Urinals.—20,981, J. Craven, Screw Presses for Pressing Bricks, &c.—21,055, S. Dallas, Floors.—21,254, W. Jackson, Chimney-pot.—21,441, F. Golby, Ceilings.—21,486, H. Parry, Kilns for Burning Lime.—21,507, G. Stewart, Ventilation of Railway and other Tunnels.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

337, T. Helliwell, Glazing Buildings.—591, W. White and H. Harry, Coverings for Walls, &c.—2,325, W. Pitt, Folding Gates.—14,888, R. Kieffert and H. Thirion, Paints.—19,908, C. Picking, Fire-proof Buildings.—19,947, W. De Gelse, Process for Preserving Timber.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

DECEMBER 9.—By *Driver & Co.*: "Platt's Farm," near Whitchurch, 116a. 2r. 33p., f., r. 180*l.*, 3,700*l.*; freehold farm containing 61a 1r. 31p., r. 93*l.* 10s., 2,280*l.*; numerous enclosures of land, 91a. 3r. 13p., f., 3,256*l.*

DECEMBER 12.—By *Weatherall & Green*: No. 6 Wharf, Amberley-rd., Paddington, u.t. 70 yrs., g.r. 20*l.*, r. 250*l.*, 3,450*l.*—By *Gilder Bros.*: 24, 26, 28, and 30, Corbyn-st., Holloway, u.t. 78 yrs., g.r. 24*l.*, 930*l.*; 66, Corbyn-st., u.t. 78 yrs., g.r. 6*l.*, r. 28*l.*, 230*l.*—By *W. J. Newell*: 92 and 94, Abbeyfield-rd., Rotherhithe, u.t. 61 yrs., g.r. 5*l.*, 620*l.*; 11, Oareboro-rd., Deptford, u.t. 73 yrs., g.r. 3*l.* 3s., 165*l.*

DECEMBER 13.—By *Chinnock, Galsworthy, & Co.*: f.g.r. of 273*l.* 8s., Vassall-rd., &c., Brixton, u.t. 9 yrs., g.r. 13*l.*, 1,080*l.*; f.g.r. of 58*l.*, Marsham-st., Westminster, reversion in 2½ yrs., 2,450*l.*; Improved rents of 132*l.*, Romany-rd., Norwood, u.t. 72 yrs., g.r. 10*l.*, 1,030*l.*; 2 to 12 (even), Carnac-st., u.t. 72 yrs., g.r. 10*l.*, 595*l.*; 10 to 16 (even), Hamilton-rd., u.t. 72 yrs., g.r. 16*l.*, r. 106*l.* 14s, 710*l.*—By *Boyce & Evens*: 258 and 260, Old-st., Shoreditch, u.t. 35 yrs., g.r. 60*l.*, 1,500*l.*—By *Messrs. Woods* (at Portsmouth): L.g.r. of 178*l.* 2s., High-st., Ryde, u.t. 880 yrs., 3,300*l.*—By *C. & H. White*: 24 and 25, Kensington-pl., Westminster, u.t. 17 yrs., g.r. 10*l.*, 370*l.*—By *Bray, Young, & Co.*: Residence, factory and 4a. 0r. 36p., Ashford, Middlesex, f., 1,460*l.*

DECEMBER 14.—By *Driver & Co.*: a plot of f. land, Woodside Green, Norwood, 280*l.*; two plots of f. land, Wickham-rd, Beckenham, 920*l.*—By *Reynolds & Eason*: f.g.r.'s of 37*l.*, Picton-st., Camberwell, reversion in 11 yrs., 640*l.*; f.g.r. of 7*l.*, Belle Vue-ter., Hendon, ditto in 88 yrs., 160*l.*; 103 and 105, King's-rd., Camden Town, u.t. 28 yrs., g.r. 10*l.* 10s., r. 58*l.*, 335*l.*; 40, Crawford-st., Marylebone, u.t. 10 yrs., g.r. 12*l.*, r. 75*l.*, 255*l.*; 52, Great Coram-st., Bloomsbury, u.t. 7 yrs., g.r. 20*l.*, r. 65*l.*, 50*l.*—By *R. H. Wheatley*: 145 and 147, The Pavement, Dulwich, u.t. 76 yrs., g.r. 13*l.*, r. 64*l.*, 465*l.*—By *Inman Sharp, Harrington, & Roberts*: 42, Kennerton-rd., Brixton, f., r. 44*l.* 4s., 470*l.*

DECEMBER 15.—By *Geo. Robins*: 98, 187, and 189, Milkwood-rd., Brixton, u.t. 74 yrs., g.r. 15*l.*, 570*l.*; 48 to 62 (even), Tucker-st., Canning Town, u.t. 72 yrs., g.r. 33*l.* 12s., 300*l.*: 49 to 67 (odd), Tucker-st., u.t. 71¼ yrs., g.r. 42*l.*, 350*l.*—By *W. Levens*: "Duryard," The Avenue, Beckenham, u.t. 72 yrs., g.r. 2*l.*, 1,445*l.*—By *Messrs. Trollope*: No. 35, Eaton-mews South, Eaton-sq., u.t. 31½ yrs., g.r. 1*l.*, 5,250*l.*—By *Newbon & Co.*: 57, Great Portland-st., Oxford-st., u.t. 27 yrs., g.r. 15*l.*, r. 95*l.*; 7, 8, and 9, Saville-st., u.t. 7 yrs., g.r. 36*l.*, r. 155*l.*, 1,200*l.*; 18, St. Stephens-av., Shepherd's Bush, u.t. 61 yrs., g.r. 7*l.*, r. 36*l.*, 295*l.*; 109, Conyingham-rd., u.t. 71 yrs., g.r. 7*l.* 6s. 5d., 305*l.*; 38 to 46 (even), Roden-st., Holloway, u.t. 68 yrs, g.r. 32*l.* 10s., r. 150*l.* 1,170*l.*; 1, Almington-st., Hornsey, u.t. 78 yrs., g.r. 6*l.* 6s., r. 30*l.*, 260*l.*; 22, Stainforth-rd., Walthamstow, u.t. 86 yrs., g.r. 5*l.*, 185*l.*; 1 and 3, Victoria-av., Upton-pk., u.t. 94 yrs., g.r. 12*l.*, r. 58*l.*, 400*l.*—By *H. J. Bliss & Sons.*—22, Church-row, Bethnal Green, f., 1,220*l.*; 24, Church-row, f., r. 33*l.* 16s., 370*l.*; 13, Ramsay-st., f., 325*l.*—By *A. Watson*: F. baker's shop, Welling, Kent, two cottages, and about 3 acres, 1,460*l.*; 75 to 85 odd, Creek-rd., Deptford, f., 1,410*l.*; f.g.r. of 17*l.* 18s. 6d., Creek-rd., reversion in 19 yrs., 655*l.*; 97 to 123 (odd) Creek-rd., f., r. 195*l.* 10s., 3,160*l.*; f.g.r. of 28*l.*, Creek-rd., reversion in 29 yrs., 810*l.*; f.g.r. of 16*l.* 16s., The Orchard, reversion in 40 yrs., 420*l.*; f.g.r. of 8*l.* 8s., The Stowage, &c., reversion in 10 and 20 yrs., 110*l.*; 68, The Stowage; 1 to 4, Cross-st.; 1 to 4 and 15 to 26, The Orchard, f., 1,860*l.*

DECEMBER 16.—By *Baker & Sons*: "The King's Arms" and house adjoining, High-st., Carshalton, f., 5,000*l.*—By *R. W. Scobell*: 328 to 340 (even), Hackney-rd., Hackney, 2 to 14 (even), Warner-pl., and stabling, &c., u.t. 32 yrs., g.r. 100*l.*, 5,540*l.*; 68 and 70, Tuilerie-st., u.t. 53 yrs., g.r. 6*l.*, 850*l.*; 41, Felton-st., Hoxton, u.t. 24 yrs., g.r. 4*l.* 5s, 120*l.*; l.g.r. of 52*l.*, Albany-st., Regent's Pk., u.t. 24 yrs., g.r. 26*l.* 16s.; and reversions to 200*l.* a year for 7¾ yrs., 490*l.*—By *Protheroe & Morris*: 93, Lillington-st., Pimlico, u.t. 33 yrs., g.r. 6*l.* 15s., r. 42*l.*, 375*l.*; 1, 2, and 3, Old Deer Pk.-villas, Richmond, u.t. 35 yrs., g.r. 10*l.*, r. 75*l.*, 650*l.*; 1 and 2, Old Deer Pk.-cottages, u.t. 35 yrs., g.r. 14*l.* 1s., 220*l.*; a block of f. land, Jocelyn-rd., 255*l.*

[*Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold: l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G.	ton	9/0/0 — 8/0/0
Teak, E.I.	load	9/10/0 — 15/0/0
Sequoia, U.S.ft.cu.		3/4 — 3/0
Ash, Canada	load	2/10/0 — 4/0/0
Birch, do.		3/5/0 — 4/10/0
Elm, do.		3/10/0 — 4/15/0
Fir, Dantzic, &c.		1/10/0 — 3/10/0
Oak, do.		3/0/0 — 5/5/0
Canada		5/10/0 — 7/0/0
Pine, Canada red		2/10/0 — 3/10/0
Do, yellow		2/10/0 — 5/0/0
Lath, D'ntzic, fath		5/0/0 — 6/0/0
St. Petersburg		5/0 0 — 7/0 0
Deals, Finland		
2nd & 1st std	100	7/10,0 — 10/0,0
Do, 4th & 3rd		7/10/0 — 8/0/0
Do, Riga		6/10 0 — 8/0/0
St. Petersburg, 1st yellow		10/10/0 — 14/10/0
Do. 2nd yellow		8/10/0 — 9/10/0
Do. white		7/10/0 — 9/10/0
Swedish		7/10/0 — 16/0/0
White Sea		8/10/0 — 17/0/0
Canada, Pine 1st		21/0/0 — 27/10/0
Do. do. 2nd		15/0/0 — 17/0/0
Do. do. 3rd, &c.		7/10/0 — 10/0/0
Do. Spruce. 1st		8/10/0 — 11/0 0
Do. do. 3rd & 2nd		6/10 0 — 8/0/0
New Brunswick		6/10/0 — 7/10/0
Battens, all kinds		3/10/0 — 15 10 0
Flooring Boards, sq., 1 in. prep. 1st		0/8/0 — 0/14/0
Do. 2nd		0/7/0 — 0/10/0
Other qualities		0/3/6 — 0/7/6
Cedar, Cuba	..ft.	/3½ — /4½
Honduras, &c.		/3½ — /4½
Mahogany, Cuba.		/4½ — /6½
St. Domingo, cargo av		/4 — 2/0
Mexican do. do		/4 — /5
Tobasco do. do		/4½ — /7
Honduras do..		/5 — /6½
Box, Turkey	ton	4/0/0 — 12/0/0
Rose, Rio		16/0/0 — 20/0/0
Bahia		9 0/0 — 15/0/0
Satin, St. Domingo	..ft.	0/0 6 — 0/1/3
Porto Rico		0/0/7 — 0/1/6

TIMBER (*continued*).		
Walnut, Italian		0 0/3½ — 0/0/7

METALS.		
IRON—Pig, in Scotland	ton	2/1/7½ — 0/0/0
Bar, Welsh, in London		5/17/6 — 6/0/0
Do. do. at works in Wales		5/7/6 — 5/10/0
Do. Staffordshire, in London		6/5/6 — 6/15/0
COPPER—British, cake and ingot		51/0/0 — 0/0,0
Best selected		52/0/0 — 0/0/0
Sheets, strong		60/0/0 — 0/0/0
Chili, bars		46/12/6 — 47/0/0
YELLOW METAL	lb.	0/0/5½ — 0 0/5½
LEAD—Pig, Spanish	...ton	9/16/3 — 9/18/9
English, com. brands		10/0/0 — 0/0/0
Sheet, English, 3 lbs. per sq. ft. and upwards		11/5/6 — 0/0,0
Pipe		11/15/0 — 0/0/0
ZINC—English sheet	...ton	22/10,0 — 0/0/0
Vieille Montagne		23,0/6 — 0/0/0
TIN—Straits	....	91/10/0 — 92/0/0
Australian	....	93/5/0 — 92/15/0
English Ingots.		96/0 0 — 96/10 0
Banca	.....	93/10/0 — 94/0/0
Billiton	.....	92/10/0 — 93/0/0

OILS.		
Linseed	.....ton	18/5/0 — 0,0/0
Cocoanut, Cochin		25/10/0 — 0/0/0
Do. Ceylon	.....	23/10/0 — 0/0/0
Palm, Lagos	....	26/10/0 — 27/0/0
Rapeseed, English pale	.....	24/15/0 — 25/0/0
Do. brown	.....	23/0/0 — 23/5/0
Cottonseed ref.	..	19/0/0 — 0/0/0
Oleine	.....	20/10/0 — 21/0/0
Lubricating, U.S.		4/0/0 — 5/0/0
Do. refined	.....	5/10/0 — 12/0/0
TAR—Stockholm	barrel	0/17,6 — 0/18/6
Archangel	....	0/12/6 — 0/0/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 12 *noon on Thursdays.*]

ACCRINGTON.—Accepted at per schedule of prices for excavating and other street work, &c., for the Corporation. Mr. W. J. Newton, C.E., Borough Surveyor, Town Hall, Accrington. Quantities by Surveyor:—

W. M. H. Berry, Oswaldtwistle.

BISHOP AUCKLAND.—Accepted for the erection of a Primitive Methodist Chapel, Auckland Park. Messrs. Davidson & Bendle, architects, 33, Grainger-street West, Newcastle-on-Tyne:—

Wm. Lodge & Sons, Plowsworth, near Chester-le-street . £357 14

BRENTFORD.—For the erection of market stalls at the new market, Kew Bridge, for the Brentford Local Board. Mr. J. H. Strachan, Surveyor:—

Lascelles & Co.	£1,850 0 0	W. A. Pryor	£1,498 0 0
Allen & Sons	1,785 0 0	Foord & Sons	1,329 0 0
J. Bloomer	1,625 0 0	J. G. Chapman	1,289 15 7
J. Biggs	1,590 0 0	Barnes, Brentford*	1,241 0 0
A. Martin	1,540 0 0		

* Accepted.

[Surveyor's estimate, £1,292.]

BRENTFORD.—For the erection of market front, at the new market, Kew Bridge, for the Brentford Local Board. Mr. J. H. Strachan, Surveyor:—

Lascelles & Co.	£1,775 0	Foord & Son, Brentford (accepted)	£1,298 0
Allen & Sons	1,685 0		
W. A. Pryor	1,435 0	J. G. Chapman	1,297 8

[Surveyor's estimate, £1,238.]

BRISTOL.—For the enlargement of National School, Bishopsworth. Mr. Froud, architect, 3, St. Stephen's-chambers, Baldwin-street, Bishopsworth, Bristol:—

D. Davis	£589 10	J. Perrott	£299 0
W. H. Cowlin & Son	387 0	A. J. Beaven	290 0
T. H. Brown	347 0	D. J. Tanner	286 10
E. T. Hatherley	337 0	Love & Waite	284 0
W. Veals	331 0	R. J. Serle	276 11
G. Elmes	325 0	H. J. Rossiter, Bedminster*	263 17
J. Child	305 0		
Brock & Sons	300 0		

* Accepted.

BRISTOL.—For the erection of lavatory-buildings, Hotwells, for the Corporation. Mr. Frederick Ashmead, C.E., Borough Surveyor, 51, Prince-street, Bristol:—

Cowlin & Son	£1,043 0 0	W. Galbraith	£940 6 0
G. H. Wilkins	1,039 11 5	J. E. Davis	926 0 0
Walters & Son	995 0 0	J. Perkins, Bristol*	795 0

* Accepted.

COLCHESTER.—For making a new road at the "Hythe," Colchester. Mr. J. W. Start, surveyor, Colchester:—

W. A. Chambers .... £275 | H. Everitt & Son £260

DARTFORD.—For forming concrete steps up the hill-side, forming ducts for pipes, and erecting cook store at the Gore Farm Hospital, near Dartford, Kent, for the Metropolitan Asylums Board. Messrs. A. & C. Harston, Architects, 15, Leadenhall-street, E.C.:—

G. Osenton	£887	A. Osborne & Co.	£482
W. Tuffee	598	W. H. Lascelles & Co., London*	481
C. Miskin	585		
W. & E. Mills	519		

* Accepted.

DURHAM.—For additions and alterations to premises, Silver street. Mr. H. T. Gradon, architect, Framwell-gate Bridge, Durham:—

Thos. Lumsden	£475 0	Jas. Laidler	£335 0
J. Shepherd	358 0	Geo. Gradon & Son	321 0
F. Gibson	347 0	John Perks & Son, Middlesbrough*	299 10
F. Caldcleugh	347 0		

* Accepted.

HADLEIGH.—For alterations and additions to the "Tuns," Hadleigh, for Messrs. Daniell & Sons. Mr. J. W. Start, architect, Colchester:—

S. Parsons	£190 0	W. Deaves	£156 12
W. Baalham	184 9		

HIGH EASTER (Essex).—For the erection of a school, outbuildings, and boundary-wall at High Easter, for the Trustees of High Easter British Schools. Mr. C. Pertwee, architect, Bank-chambers, Chelmsford, Essex:—

H. Potter	£590 0	W. E. Letch	£510 0
S. Parmenter	587 0	H. Gozzett, Woodham Walter*	496 5
E. West	583 0		
H. Kennell	572 0	W. Drewry	464 10
F. Johnson	565 0		

* Accepted.

LLANDILO.—For additions and alterations to the Penygroes School, for the Llandebie United District School Board. Mr. David Jenkins, architect, Llandilo:—

Thomas Davies	£687	Thomas Watkins & Co., Swansea*	£600
Griffith Vaughan	637		
		D. Pugh Jones	596

* Accepted.

LONDON.—For the enlargement of the Addington-street School, York-road, Lambeth, by 131 places, and for carrying out other works to the school, for the School Board for London. Mr. T. J. Bailey, Architect:—

		If brickwork be built in cement, add	
Colls & Sons	£2,957 0 0 ..	£26 0 0	
F. J. Coxhead	2,916 0 0 ..	47 0 0	
E. E. Nightingale	2,900 0 0 ..	48 0 0	
Holloway Bros.	2,654 0 0 ..	35 0 0	
Lathey Bros.	2,539 0 0 ..	36 0 0	
James Smith & Sons	2,478 0 0 ..	30 0 0	
Co-operative Builders, Ltd.	2,466 10 0 ..	—	
W. Gregar & Son, Stratford	2,459 0 0* ..	30 0 0*	

* Recommended for acceptance by the Works Committee.

LONDON.—For carrying out works to the drainage and sanitary arrangements at the Lyndhurst-grove School, Peckham, for the School Board for London:—

H. Mallett	£359 0 0	Maxwell Bros., Ltd.	£298 0 0
W. Downs	344 0 0	J. Frampton, 1, Henslow-road, East Dulwich*	273 0 0
Holloway Bros.	324 0 0		
W. & H. Castle	304 15 5		

* Accepted by the Works Committee.

LONDON.—For removing an iron building from the Honeywell-road site, Wandsworth, and for re-erecting it on the Stockwell-road site, Brixton, for the School Board for London:—

W. Harbrow	£239 13	T. Cruwys, 49, Caroline-street, Camden Town*	£198 0
D. Charteris	215 0		
Crogon & Co., Ltd.	207 10		

* Recommended for acceptance by the Works Committee.

LONDON.—For providing and fixing heating apparatus on the low-pressure steam system, with the necessary boilers, for the new school in course of erection on the Hugh Myddelton site, Clerkenwell, for the School Board for London. Mr. T. J. Bailey, Architect:—

Purcell & Nobbs	£980	G. Davis	£896
W. G. Cannon	949	J. Grundy, Duncan-terrace, City-road, N.*	855
J. & F. May	910		

* Recommended for acceptance by the Works Committee.

LONDON.—For enlarging the Battersea Park-road school by 197 places; for erecting a laundry centre, and for carrying out other works, for the School Board for London. Mr. T. J. Bailey, Architect:—

		Add if Brickwork built in cement.
Kirk & Randall	£13,575	£183
Hart Bros.	13,149	171
Holliday & Greenwood	12,675	160
S. & W. Pattinson	12,529	120
E. Lawrance & Sons	12,245	171
J. Marsland	12,065	150
Foster & Dicksee	11,895	133
James Longley & Co.	11,791	192
D. Charteris	11,497	190
W. Downs	11,170	125
J. & M. Patrick, Rochester	10,795*	266*

* Recommended by the Works Committee for acceptance.

LONDON.—For the enlargement of the Blackstock-road School, Highbury, by 382 places, and for the enlargement of the Infants' cloak-room, for the School Board for London. Mr. T. J. Bailey, Architect:—

		Add if brickwork built in cement.
G. S. S. Williams & Sons	£2,963	£65
Kirk & Randall	2,748	66
E. Lawrance & Sons	2,699	89
W. M. Dabbs	2,672	67
J. Grover & Son	2,670	36
Charles Cox	2,528	62
D. Charteris, Page-street, Westminster	2,475*	66*

* Recommended by the Works Committee for acceptance.

LONDON.—For enclosing, draining, levelling, &c., land in connection with the Laxon-street School, Bermondsey; for erecting new water-closets for all the departments of the school, and for other work, for the School Board for London. Mr. T. J. Bailey, Architect:—

Holliday & Greenwood	£2,536	Whitehead & Co.	£1,605
H. Mallett	2,100	Garrett & Son, Clapham*	1,558
D. Charteris	1,900		

* Recommended by the Works Committee for acceptance.

LONDON.—For disconnecting and ventilating the drains, &c., in connexion with the Fiora-gardens School, Hammersmith, for the School Board for London:—

John Mowlem & Co.	£250	Charles Humphrey	£171
G. P. Kent	219	S. Polden, Woodstock-road, Uxbridge-road*	149
Peattie & Axtell	186		
G. Lyford	176		

* Accepted by the Works Committee.

LONDON.—For fitting up a room in the boys' department of the Wilton-road School, Dalston, as a chemical laboratory, for the School Board for London:—

E. Lawrance & Sons	£250	F. Britton, Leconfield Works, Highbury*	£175
Norris & Luke	202		

* Accepted by the Works Committee.

LONDON.—For draining, levelling, &c., land in connexion with the Penrose-street School, Walworth, and for providing covered playground for the girls' and infants' department, for the School Board for London. Mr. T. J. Bailey, Architect:—

Smith & Sons	£639	J. Tyerman	£425
J. Derry	587	J. Marsland, 1, York-street, Walworth*	408
W. Downs	468		

* Recommended by the Works Committee for acceptance.

LONDON.—Accepted for tar-paving and other works to three nursing courts at the Eastern Hospital, the Grove, Homerton, for the Metropolitan Asylums Board. Messrs. A. & C. Harston, Architects, 15, Leadenhall-street, E.C.:—

A. C. W. Hobman & Co., South Bermondsey £449 10 0

LONDON.—For rebuilding rear portions of Nos. 43 and 45, Digby-road, South Hornsey, for Mrs. J. R. Matthias:—

H. Brown	£297	A. Boon	£250
Green & Smith	275	J. H. Thompson*	175
John Groves	258 10		

* Accepted.

NEWPORT (Mon.).—For alterations and additions to bakery, Caerleon-road, Newport, for Mr. C. Collier. Mr. W. H. Watling, architect, Council Chambers, Newport:—

W. M. Blackburn	£179	C. Lock, Caerleon-road, Newport (accepted)	£175 10
E. Richards	179		

NEWPORT (Mon.).—For alterations and additions to house No. 23, Hill-street, Newport, for Mr. A. Rees. Mr. W. H. Watling, architect, Council Chambers, Newport:—

J. Brownscombe	£164	J. Diamond	£154
C. Lock	159	E. Richards, Price-street, Newport (accepted)	144
W. Matthias	155		

NEWPORT (Mon.).—Accepted for the erection of shop and dwelling-house, No. 82 Commercial-road, Newport, for Mr. C. Pullin. Mr. W. H. Watling, architect, Council Chambers, Newport. Quantities by the architect:—

Wm. Matthias £750 0 0

NEWPORT (Mon.).—For the erection of fifty terrace houses on Penllyn Estate, Newport, Mon., for the Newport Land and Building Corporation, Limited. Mr. W. L. Griffiths, architect, Newport, Mon.:—

Hy. Welsh	£24,000	Frank Ashley	£19,000
Stephens, Bastow, & Co., Limited	23,429	Morgan & Roberts, Newport*	18,000
John Jenkins	22,800		

* Accepted.

NORTHAMPTON.—For alterations to premises, Gold-street, for Messrs. Johnson & Wright. Mr. Edmund Law, architect, Abington-chambers, Northampton. Quantities by the architect:—

R. Finnegan	£2,250	E. Archer	£1,981
Woodford & Son	2,228 15	Green Bros.	1,974
G. J. Fisher	2,213	H. Martin	1,960
Robt. Cosford	2,134	Wm. Beardsmore	1,895
Branson & Son	2,099	J. B. Clarke	1,892
A. F. Hawtin	2,044	J. Dunckley*	1,863
J. Y. Wingrove	1,999		

* Accepted.

[All of Northampton.]

NOTTINGHAM.—For works at the Bath-street Recreation Ground (three contracts). Mr. Arthur Brown, Borough Surveyor, Guildhall, Nottingham. Quantities by Surveyor:—

Contract No. 1—Stonework.

Bell & Sons	£319	Garton & Burton	£306
Mangeson & Son	285	H. Vickers	207 10
H. Green	252	J. G. Thomas (accepted)	203 7
Hodson & Son	239 16		

[All of Nottingham.]

Contract No. 2—Ironwork.

Miller & Sons	£686 19 6	W. H. Burbidge	£481 11 4
Keay & Co.	609 17 0	W. Danks & Co.	475 0 0
H. Vickers	585 0 0	Johnson Bros.	461 17 10
H. Caldwell	573 19 0	Marshall Bros.	460 6 0
Goddard, Massey, & Warner	568 0 0	W. H. Raynor, Nottingham*	4.8 18 8
Cowen & Co	545 6 4	Raybould & Co. (withdrawn)	360 0 0
T. Danks & Co.	515 0 0		
Sands	500 0 0		

* Accepted.

Contract No. 3—Gardening

Toop	£1,608 0 0	Bardill (accepted)	£1,361 2 4

[Both of Nottingham.]

ORPINGTON (Kent).—For additions and alterations to Chislehurst-road School, for the Orpington School Board. Mr. George St. Pierre Harris, architect, 1, Basinghall-street, E.C. Quantities by Messrs. C. Stanger & Sons, surveyors, 21, Finsbury-pavement, E.C.:—

Osborne & Co.	£3,317 9 2	Gregory & Co.	£2,817 0 0
R. Lowe	2,934 16 0	D. Payne	2,759 0 0
W. Grubb	2,893 16 0	Holloway Bros.	2,742 0 0
Lorden & Son	2,834 0 0	Somerford & Son	2,623 0 0
Duthoit	2,823 0 0	Akers & Co.*	2,418 0 0

* Accepted subject to the approval of the Education Department.

REDRUTH.—Accepted for the erection of a dwelling-house, shop, bakehouse, and stores, at Fore-street, Redruth, for Mr. W. Snell. Mr. Sampson Hill, architect, Redruth:—

Mason—Samuel Head £549 0 0
Carpenter and Joiner—W. C. Hodge 352 0 0

REDRUTH.—Accepted for rebuilding dwelling and shop, Bond-street, Redruth, for Mrs. Teague. Mr. Sampson Hill, architect, Redruth:—

James Goldsworthy and Edward Salter £471 0 0

REDRUTH.—For the erection of grand stand, for the Redruth Recreation Grounds Company. Mr. Sampson Hill, architect, Redruth:—

T. Martin	£137 0	T. H. Hancock	£125 10
W. C. Hodge	130 0	E. Salter (accepted)	118 0

TORQUAY.—For the construction of a concrete sea-wall, &c., Torbay-road, for the Town Council. Mr. H. A. Garrett, Borough Engineer, Town-hall, Torquay:—

Locke	£3,070 12 0	Pervin & Lang	£1,390 5 0
G. & H. Goss	2,710 0 0	Matthews	1,341 4 6
Jno. Shaddock	1,675 0 0	Hill & Son, Gosport*	1,300 0 0
Cochrane & Sons	1,550 0 0		

* Accepted.

[Engineer's Estimate, £1,399.]

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Dated this 12th day of December, 1892

MARTIN ERNEST MOHUN,
JOHN H. KNIGHT.

Witness, T. KING WARHURST, Solicitor,
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B. M. WILLIAMS,
Medical Officer of Health.

Municipal Buildings, Plymouth,
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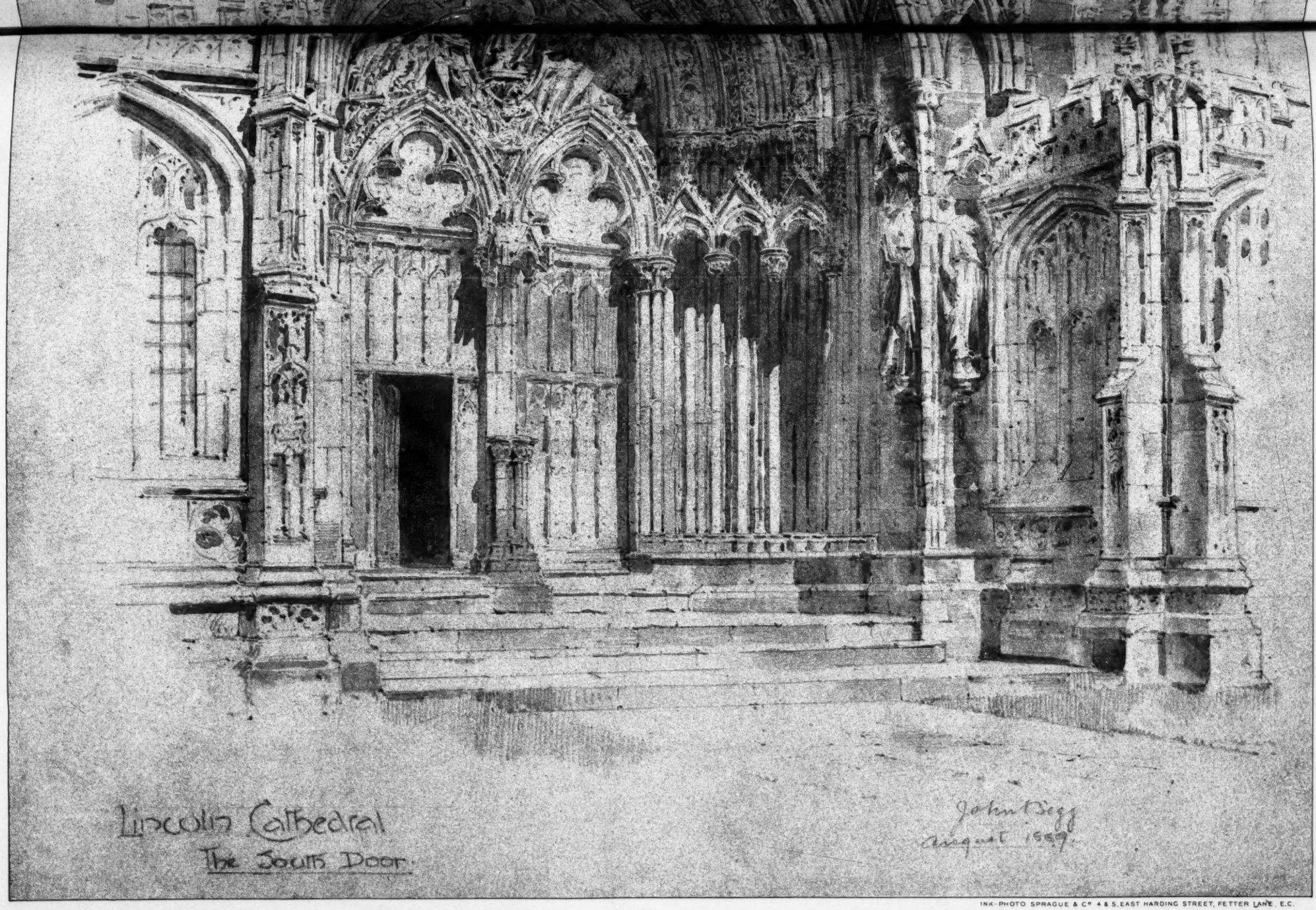
Borough Engineer and Surveyor.

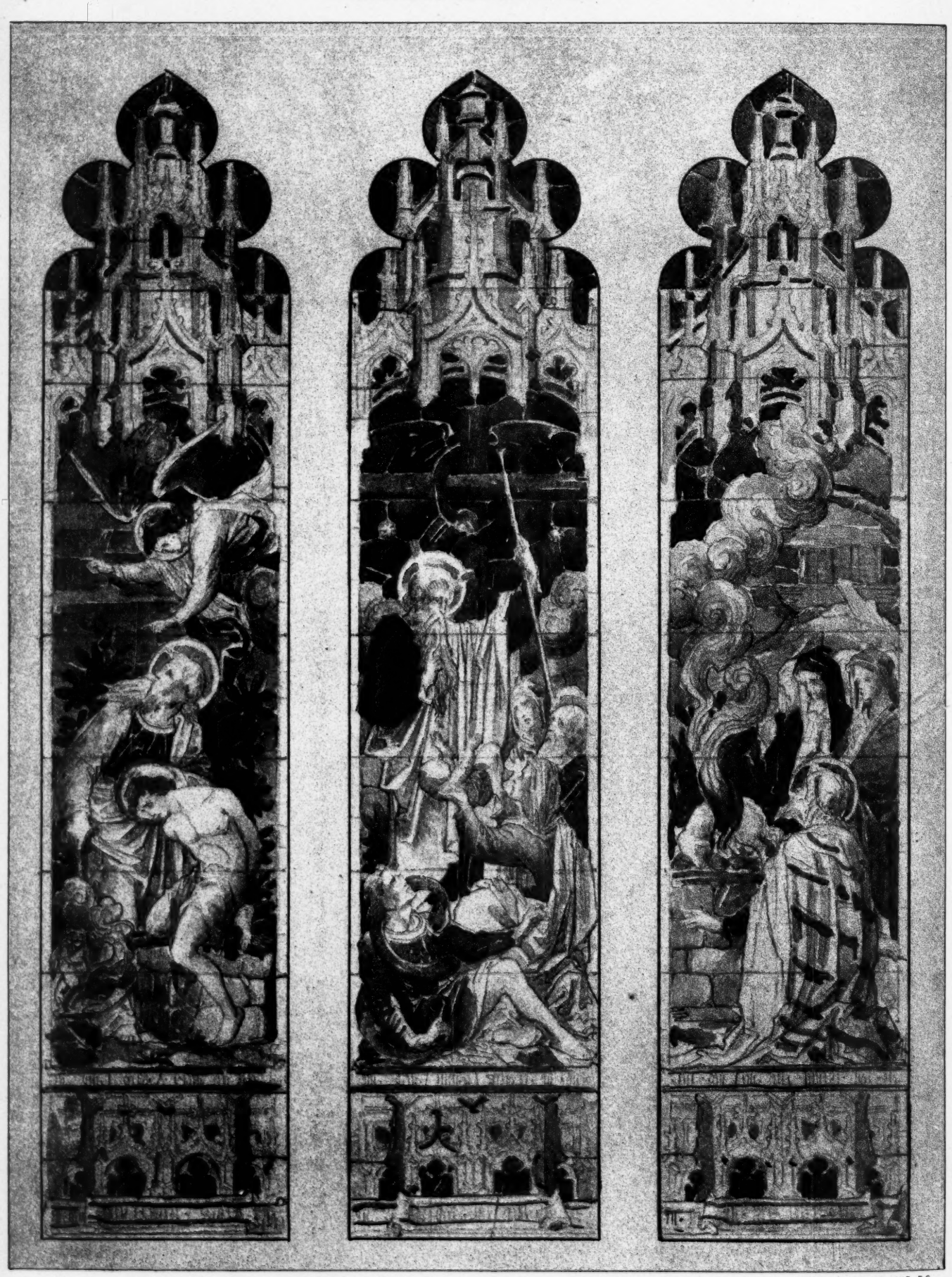
Town Hall, Leicester.



Lincoln Cathedral
The South Door.

John Sell Cotman
August 1809.

INK-PHOTO SPRAGUE & Co 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.



INK-PHOTO. SPRAGUE & Cº 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

SKETCH DESIGN: AISLE WINDOW, BLACKBURN CHURCH.—By Mr. Ion Pace.

Royal Academy Exhibition, 1892.

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EAST WINDOW OF SOUTH AISLE, LEIGH CHURCH, LANCASHIRE.—By Messrs. Shrigley & Hunt.

Royal Academy Exhibition, 1892.

PHOTO-LITHO. SPRAGUE & Co 4 & 5 EAST HARDING STREET FETTER LANE E.C.

A STREET CORNER.—By Mr. Clarence Coggin, A.R.I.B.A.

Royal Academy Exhibition, 1892.

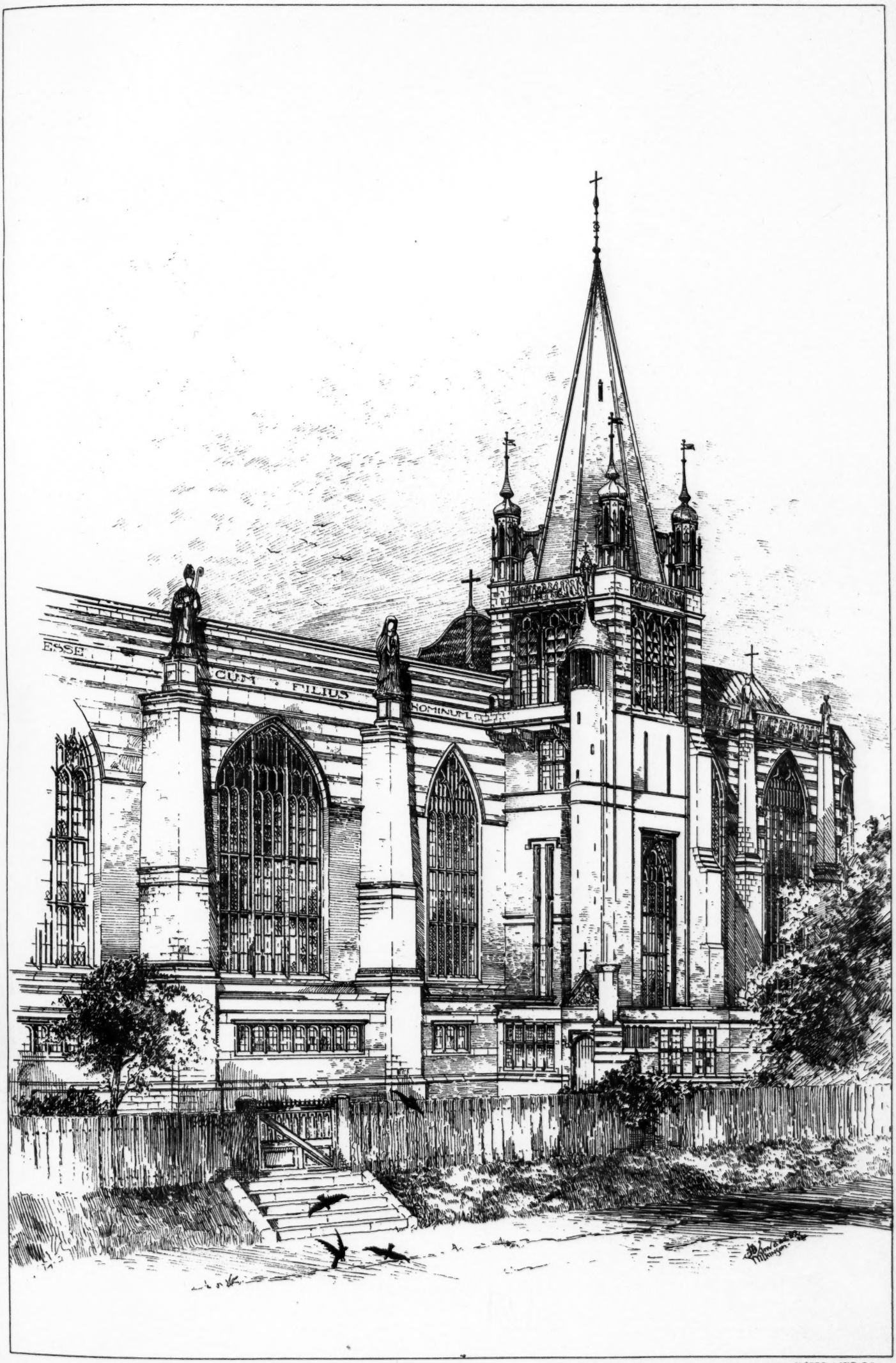


PHOTO-LITHO. SPRAGUE & Co 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

A PORTION OF PROPOSED MEMORIAL CHURCH.—Mr H. D. Wilkinson, Architect.

Royal Academy Exhibition, 1892

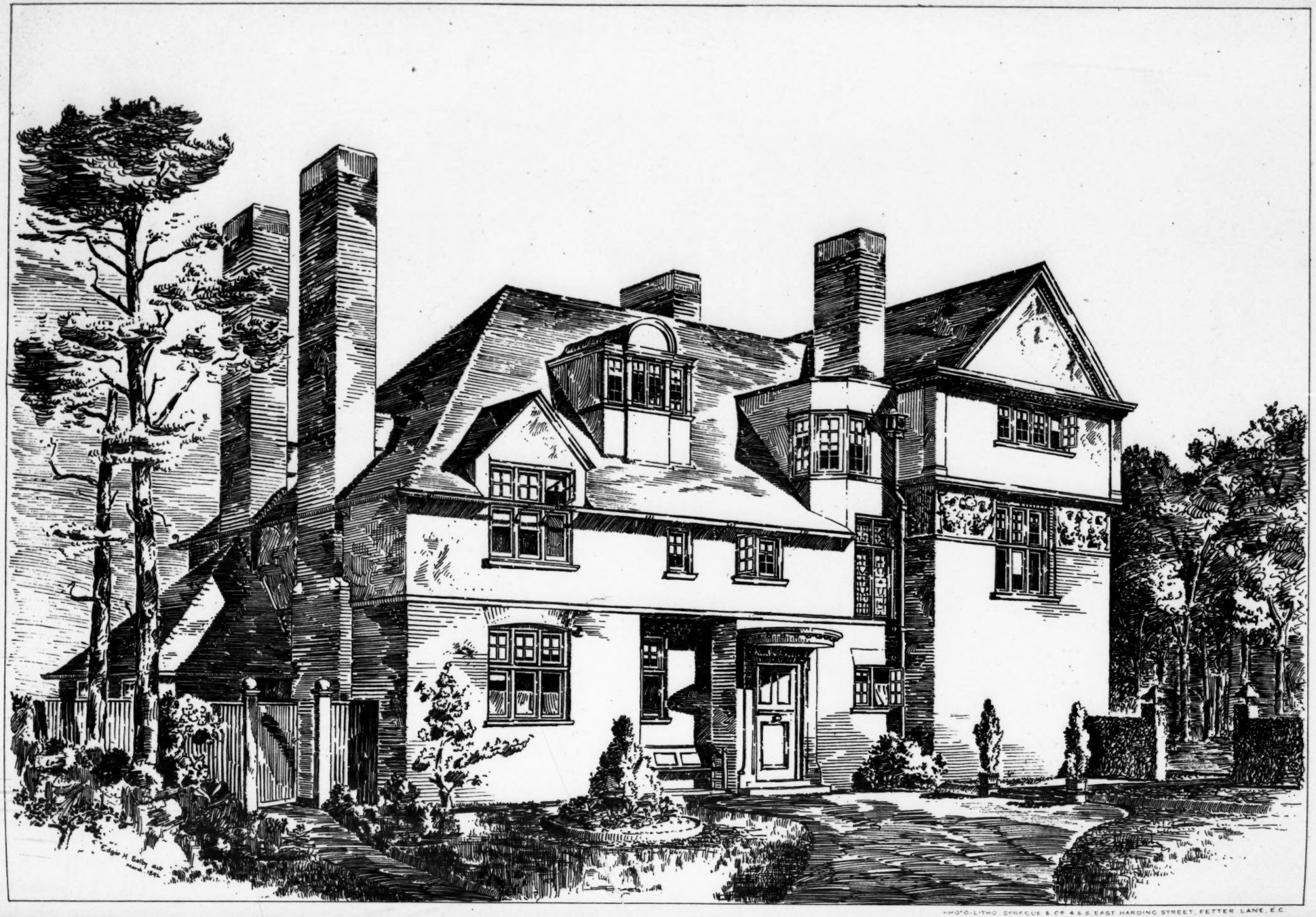
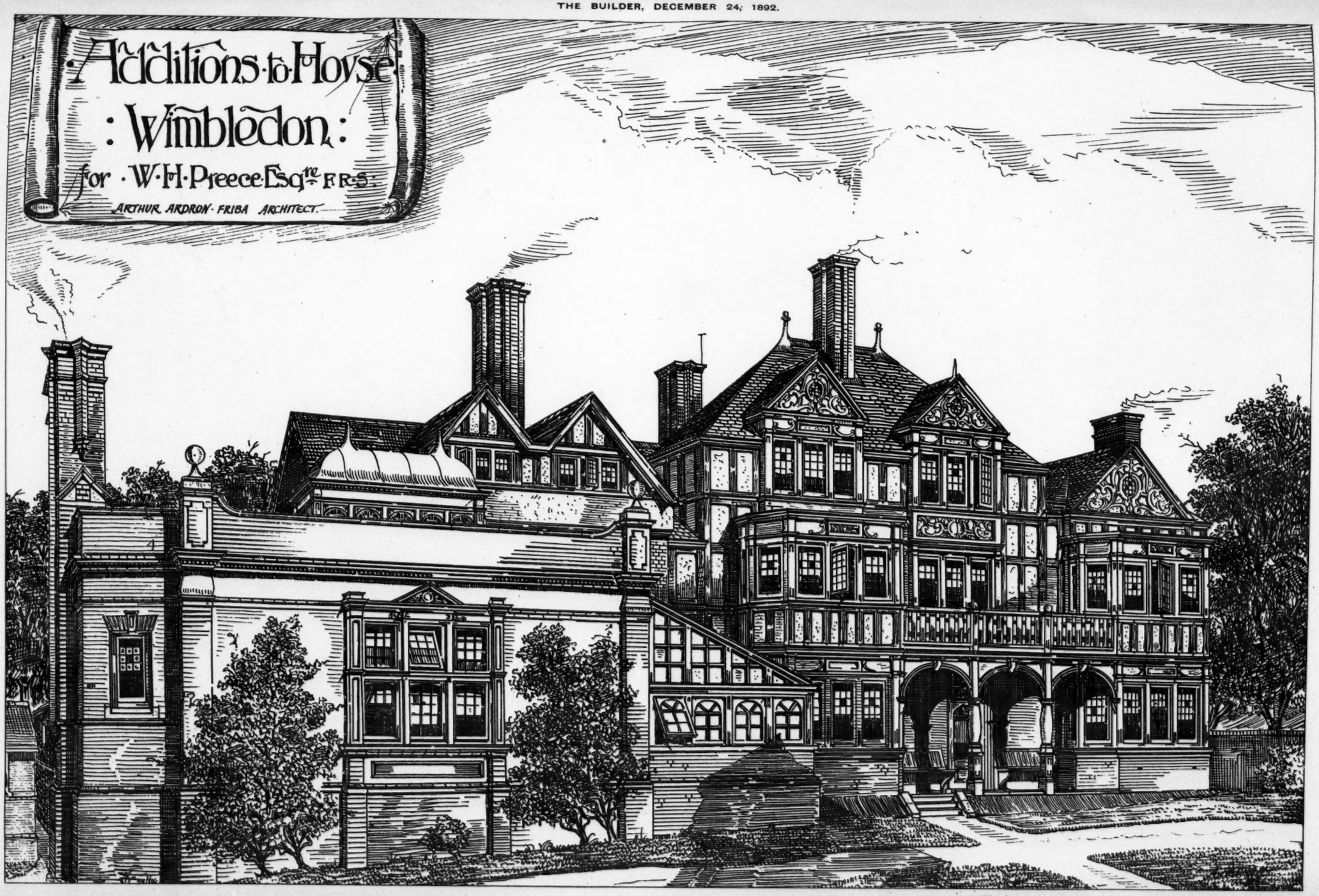


PHOTO-LITHO. SPRAGUE & Co. 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

A COUNTRY HOUSE, AMPTHILL.—Mr. Edgar H. Selby, A.R.I.B.A., Architect.

A COUNTRY HOUSE, AMPTHILL.—MR. EDGAR H. SELBY, A.R.I.B.A., ARCHITECT.



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